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THE  
OPHTHALMIC REVIEW

*A RECORD OF OPHTHALMIC SCIENCE*

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EDINBURGH.

WITH THE ASSISTANCE OF

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## CONGENITAL DEFECT OF ABDUCTION ASSOCIATED WITH RETRACTION OF THE EYEBALL IN ADDUCTION.

BY J. JAMESON EVANS, M.B.Edin., F.R.C.S.Eng.,  
Birmingham.

THE signs and symptoms of the cases here described, and some similar ones which are on record, form a distinct clinical picture whose most prominent features are indicated in the title. These and other characters which appear to have been usually associated with them may be briefly summarised as follows :—

The condition is congenital, but in consequence of the small amount of discomfort and deformity, the child is not usually brought to the notice of the ophthalmic surgeon for some years. In most cases the defect is confined to one eye.

In the primary position the axis of the affected eye may be parallel with that of its fellow, or it may converge or diverge slightly. The eye may also be appreciably enophthalmic, and in that case the palpebral fissure is narrowed. The distinctive features of the case become apparent when the patient attempts to move the eyes laterally.

Attempted conjugate movement towards the unaffected side is associated with imperfect rotation inwards of the faulty eye, its retraction into the orbit and narrowing of the palpebral fissure, and sometimes an upward or downward rotation of the globe. On the contrary, when the patient attempts to turn the eyes towards the affected side the defective eye

comes forward and widens the palpebral aperture to an extent equal to that of the normal side, but fails to move outwards beyond the vertical mesial plane of the orbit. It appears to assume the position as a result of complete relaxation of the internal rectus rather than from any action of the external rectus, which is probably functionless.

When the patient is directed to make an effort of convergence the healthy eye rotates inwards, but its fellow assumes the primary position, and at the same time comes forward and widens the palpebral aperture, in fact there is often a complete loss of convergence, which is replaced by attempted conjugate movements to the affected side.

The pupils under such circumstances do not contract when convergence is attempted. In a number of cases (*v. table*, pp. 6-10) it has been found impossible to rotate the eyeball fully inwards by traction with conjunctival forceps. In others a similar restriction has been found in rotation outwards only.

The vision of the affected eye is seldom up to the normal standard, and not infrequently it is highly amblyopic. Diplopia may be absent altogether, or it may be present constantly, or only when certain movements are attempted. Headaches have also been noted, but as a rule the discomfort caused by the condition is insignificant. The anomaly seems to be more common in the female than in the male (14 out of 19 being in females), and much more common on the left than on the right side. Out of 27 cases which are on record, 20 were affected on the left side, 4 on the right side, and 3 were bilateral.

It is seldom that more than one member of a family is affected, though there are distinct exceptions to this rule (*v. table*). Before discussing their pathology and treatment I will briefly describe two cases which I have had under my care.





CASE I.—Primary position.



CASE I.— Attempted conjugate movement to the right.  
Left eye recedes as it turns inwards.



CASE I.— Attempted conjugate movement to the left.  
Left eye advances and fails to turn outwards.






CASE I.—Sophie R., aged 7, daughter of a Russian Jew, was the only one in the family who had anything wrong with the eyes. The parents had noticed a peculiarity of the left eye soon after birth, so that presumably the condition was congenital.

*Right Eye.*—R. V. cum + .50 D. sph.  $\subset$  + 2 D. cyl. vert. =  $\frac{6}{8}$ ; no abnormality of eyeball or appendages, and no irregularity of movement.

*Left Eye.*—L. V. cum + .50 D. sph. = fingers at 1 metre. In the *primary position*, the palpebral fissure was slightly narrower than the right, and the eye was slightly adducted and enophthalmic, when the patient looked *to the right* the left eye moved through a smaller angle than the right. This incomplete adduction was associated with a retraction of the globe (increased enophthalmos) and a rotation of the eyeball downwards. This latter displacement did not take place if the patient was directed to look *up* and to the right. When the patient looked *to the left*, the left eye came forward and appeared as prominent as the right, but it did not move beyond the middle line. At the same time the palpebral aperture assumed the dimensions of that on the right side. The patient was quite incapable of making an effort of convergence, which was replaced by an effort of conjugate movements to the left and its associated phenomena, viz., propulsion of the globe, abduction as far as the median plane only, and a disappearance of all signs of enophthalmos and of narrowed palpebral fissure.

Traction with conjunctival forceps produced rotation inwards, apparently to the normal extent, but failed to produce it outwards beyond the middle line. Diplopia was not complained of. Binocular vision probably had never existed.

*Treatment and Progress.*—Assuming that the deformity was due to a mooring of the left eye by an inextensible external rectus I determined to operate, in the hope of removing the impediment by lengthening the tendon of this muscle. On exposing the tendon I found its apparent insertion 10 mm. behind the corneal limbus. The structure representing the muscle was largely fibrous, but was not absolutely inelastic.

Its general appearance and feel suggested that there might be some muscular fibres in its upper half at least. The lower half seemed more definitely fibrous and inextensible. On stimulating the muscle by means of a faradic current I got no contraction. Microscopical examination of a small piece removed for the purpose displayed distinct bundles of muscular fibres. These, however, did not stain well, and their striation was very imperfect, the tendon was lengthened by the ordinary  method, the anterior end of the upper (more elastic) portion being united to the posterior end of the more fibrous half; by this means all obstruction to passive rotation inwards was removed. The conjunctival flap was sewn up.

On the following day there was a pronounced convergent strabismus, and the retraction of the globe with its associated signs were in no way diminished as far as could be judged. As the squint persisted and intensified the deformity, I divided the left internal rectus tendon ten days later. The apparent insertion of this tendon was 10 mm. behind the corneal margin. It appeared to be more bulky and more fibrous than normal. Owing to the shortness and inextensibility of the muscle and the consequent impossibility of rotating the eye outwards, the hook and scissors had to be passed well back into the orbit to make the section. On the division of the tendon the eye immediately responded to traction outwards with forceps. No microscopical examination was made of this muscle.

A week later it was noted that there was very slight power of adduction in the left eye, and that what little existed was associated with a corresponding degree of retraction of the globe and narrowing of the palpebral fissure. A few weeks later the power of adduction was practically the same as before the operation, and the retraction and narrowing of the lid aperture were in no way diminished. Further attempts at rectifying the eye appeared undesirable at the time, and the patient was consequently discharged from the hospital.

CASE 2.—(I am indebted to my colleague, Mr. Eales, for the opportunity of investigating this case. The patient





CASE II. Primary position.



CASE II. Attempted conjugate movement to the right.  
Left eye recedes as it turns inwards.



CASE II. Attempted conjugate movement to the left.  
Left eye advances and fails to turn outwards.



presented very much the same symptoms as the first, but in a less marked degree.)

William G., aged 7, was brought for consultation in consequence of defective sight, which interfered with his progress at school. He was physically and mentally feeble, and the subjective symptoms were difficult to elicit. The mother stated that the labour had been instrumental, and that his eyes had been peculiar from birth. He was the only one in the family afflicted with bad eyes.

*Right Eye.*—Normal in appearance, but movements outward, upward and inward were slightly impaired. R. V. —  $\frac{6}{8}$  emmetropic.

*Left Eye* =  $\frac{6}{12}$  emmetropic.

*In the Primary Position.*—Both eyes were deeply set, but the left was slightly more so, and the left palpebral aperture was slightly narrower than the right. Its axis was parallel to that of the right eye. When the patient looked *to the right* adduction was restricted, the eye was slightly drawn back into the orbit and the palpebral aperture became narrower. On looking *to the left* the eye became as prominent as the right, the palpebral aperture widened, but the eye did not move beyond the middle line. Convergence was replaced by attempted conjugate movement to the left, and its accompaniments, and there was loss of the associated pupil reflex. There was slight impairment of upward movement as in the right eye. Traction with forceps produced free movement inwards, but the eye could only be rotated outwards as far as the middle line. Binocular vision was present in the primary position, but diplopia occurred on looking either to left or right.

The deformity was not pronounced in this case, and I did not think it necessary to operate, especially as the patient had been brought for improvement of sight rather than for correction of deformity.

#### PATHOLOGY AND TREATMENT.

There seems considerable doubt as to the nature of the pathological lesion or lesions which could give rise to the train of symptoms above described. I think it is

| (a)<br>No. | (b)<br>Observer               | (c)<br>Sex, Age,<br>and Side | (d)<br>Refraction and Vision                             | (e)<br>Condition of<br>Eyes<br>in Primary<br>Position                           | (f)<br>Effect of Attempted Con-<br>jugate Movement towards<br>the Unaffected Side   | (g)<br>Effect of Attempted<br>Conjugate<br>Movement towards<br>Affected Side  | (h)<br>Effect<br>of Attempted<br>Convergence | (j)<br>Effect<br>of Passive<br>Traction | (k)<br>Remarks   |
|------------|-------------------------------|------------------------------|--|---|---|---|--|---|--|
| 1          | Heuck                         | F., 53,<br>Bilateral         | $V = \frac{6}{60}$ and J. 4                              | Both eyes<br>directed<br>downwards  | Slight rotation of eyes<br>inwards  | Slight rotation in-<br>wards  | Moderate<br>convergence                      | ?                                       | All movements impaired,<br>with ptosis. Some retrac-<br>tion of eyes with every<br>energetic attempt at mo-<br>tion. Abnormal insertion<br>of muscles found. |
| 2          | Stilling                      | ? ? L.                       | ?  | Divergence  | L., retraction of eye;<br>narrowing of palpe-<br>bral aperture; no ad-<br>duction   | No abduction ...  | ?  | ?                                       | Int. rectus normally in-<br>serted. Condition aggra-<br>vated by advancement of<br>int. rect.  |
| 3          | Sinclair<br>(Parker)          | F., 9, L.                    | $R. c. + 1 = \frac{6}{6}$<br>$L. c. + 1 = \frac{6}{6}$   | L. eye re-<br>tracted and<br>smaller (?),<br>divergent<br>strabismus            | L., partly closed from<br>partial closure of up-<br>per and lower lids;<br>eye partly retracted;<br>adduction impaired                                    | Lids of right eye<br>partly closed;<br>L., abduction<br>impaired  | ? Pupil re-<br>flexes nor-<br>mal            | ?                                       |  |
| 4          | Sinclair<br>(Nettle-<br>ship) | M., 6, L.                    | $R. c. + 1 = \frac{6}{12}$<br>$R. c. + 1 = \frac{6}{12}$ | L., enoph-<br>thalmos   | L., closure of lids; re-<br>traction of eye; rota-<br>tion inwards limited  | L., abduction<br>much restricted;<br>movement up<br>and out nearly<br>normal; move-<br>ment down, and<br>down and out<br>normal | ? L. pupil<br>reflex slug-<br>gish           | ?                                       |  |
| 5          | Sinclair<br>(Nettle-<br>ship) | F., 6, L.                    | $R. c. + 3 = \frac{6}{6}$<br>L = Fingers and J. 10       | L. eye looks<br>smaller than<br>R.; palpe-<br>bral aper-<br>tures same<br>width | L., retraction of eye;<br>partial closure of lids,<br>the lower lid show-<br>ing pulling muscular<br>movement; rotation<br>inwards limited and<br>delayed | L., no movement<br>beyond the mid-<br>dle line  | ? Pupil re-<br>flexes nor-<br>mal            | ?                                       |  |
| 6          | Sinclair<br>(Mac-<br>Lehose)  | F., 10, L.                   | $R. c. + 1 = \frac{6}{6}$<br>$L. c. + 1 = \frac{6}{6}$   | L., enoph-<br>thalmos;<br>axes paral-<br>tel                                    | L., narrowing of pal-<br>pebral fissure; in-<br>creased retraction of<br>upper and lower lids   | L., no movement<br>outwards be-<br>yond middle<br>line  | ? Pupil re-<br>flexes nor-<br>mal            | ?                                       |  |



|    |                              |                  |   |  |  |   |                                   |   |
|----|------------------------------|------------------|---|--|--|---|-----------------------------------|---|
| 7  | Sinclair<br>(Mac-<br>Lehose) | F., 4, L.        | ?   | Axes parallel  | L., partial closure of<br>palpebral fissure;<br>retraction of globe<br>with slight rolling<br>upwards; adduction<br>good           | L., no movement<br>outwards be-<br>yond middle<br>line            | ? Pupil re-<br>flexes nor-<br>mal | ?   |
| 8  | Türk                         | ? ? L.           | ?   | Convergence  | L., retraction of globe;<br>narrowing of palpe-<br>bral aperture   | L., no movement<br>outwards be-<br>yond middle<br>line            | ?                                 | ?   |
| 9  | Türk                         | ? ?<br>Bilateral | ?   | Axes parallel  | Retraction of adduct-<br>ing globe, with nar-<br>rowing of palpebral<br>aperture   | Abduction absent<br>on both sides                                 | ?                                 | ?   |
| 10 | Türk                         | ? ? L.           | ?   | Axes parallel  | L., retraction of globe;<br>narrowing of palpe-<br>bral aperture   | L., nearly com-<br>plete loss of ab-<br>duction                   | ?                                 | ?   |
| 11 | Collins                      | M., 20,<br>L.    | R. = $\frac{6}{6}$<br>L. = $\frac{6}{6}$ J. 1 | L. eye more<br>deeply set<br>and smal-<br>ler than<br>R.; pal-<br>pebral<br>apertures<br>equal | L., slight rotation in-<br>wards and upwards;<br>retraction of globe,<br>narrowing of palpe-<br>bral aperture; crossed<br>diplopia | L., defective<br>movement out-<br>wards; homon-<br>ymous diplopia | ? Pupil re-<br>flexes nor-<br>mal | ?   |
| 12 | Braun-<br>schweig            | ? ? R.           | ?   | Divergence   | R., retraction of globe  | R., no abduction  | ?                                 | All movements of right eye<br>impaired.   |
| 13 | Frieden-<br>wald             | ? ? L.           | ?   | Axes parallel  | L., slight adduction;<br>retraction of eye   | L., abduction ab-<br>sent   | ?                                 | ?   |
| 14 | Bahr                         | ? ? L.           | ?   | Apparent<br>convergent<br>strabismus   | L., slight adduction,<br>with retraction; nar-<br>rowing of palpebral<br>aperture  | L., no abduction  | ?                                 | Second band of int. rect.<br>found, acting exclusively<br>as retractor. No abducens<br>found. |
| 15 | Inouye                       | ? ? R.           | ?   | Divergence   | R., adduction 1 mm.,<br>with retraction of<br>globe and narrow-<br>ing of palpebral aper-<br>ture                                  | R., abduction<br>nearly com-<br>pletely absent                    | ?                                 | Broad tendinous band in-<br>serted far forwards found<br>instead of ext. rectus.              |

| (a) | (b)      | (c)                               | (d)  | (e)  | (f)  | (g)   | (h)  | (j)   | (k)   |
|-----|----------|-----------------------------------|--|--|--|---|--|---|---|
| No. | Observer | Sex, Age, and Side                | Refraction and Vision  | Condition of Eyes in Primary Position  | Effect of Attempted Conjugate Movement towards the Unaffected Side   | Effect of Attempted Conjugate Movement towards Affected Side                                    | Effect of Attempted Convergence  | Effect of Passive Traction                          | Remarks   |
| 16  | Wolff    | F., 19, R.                        | R. $\frac{5}{10} + \frac{1}{1.25} \div 50 = \frac{5}{5}$<br>L. Em. | R., divergent strabismus, 20°; enophthalmos; narrowed palpebral fissure; no diplopia | R., retraction and upward rotation of globe; narrowing of palpebral fissure; marked restriction of inward rotation | R., propulsion of globe, widening of palpebral aperture; no movement outward beyond middle line | No convergence present, replaced by conjugate movement to right, and produces same effect. Pupillary reflexes normal | Movement outwards impossible, movement inwards free | —   |
| 17  | Wolff    | M., 5½, R.                        | R. = $\frac{6}{6}$ ?<br>L. = $\frac{6}{6}$                         | Axes parallel  | R., retraction of globe, with rotation downwards; restricted adduction; narrowing of palpebral fissure             | R., propulsion of globe; no abduction beyond middle line; widening of palpebral aperture        | Convergence to 12 cm.; retraction of R. eye, as in looking to left ?   | ?   | —   |
| 18  | Wolff    | F., 20, L.                        | R. = $\frac{6}{6}$<br>L. = $\frac{6}{6}$                           | L., divergent strabismus, 15° — 20°; crossed diplopia                                | L., retraction of globe, with slight upward rotation; restricted adduction; narrowing of palpebral fissure         | L., propulsion of globe; abduction only; widening of palpebral aperture                         | ?  | ?   | L., Recti normally inserted; ext. rect. divided, giving temporary loss of abduction and retraction. Relapsed. |
| 19  | Wolff    | F., 14, Bilateral, L. more marked | ?  | L., slight divergent strabismus; crossed diplopia                                    | L., retraction of globe; limited adduction; narrowing of palpebral aperture. R., same, but less marked             | L., no abduction beyond middle line. R., diminished abduction (?)                               | ?  | ?   | Cases 18, 19 and 20 are members of one family.  |
| 20  | Wolff    | M., 9, L.                         | R. } $\frac{6}{6}$<br>L. } $\frac{6}{6}$                           | Orthophoria  | L., slight retraction of globe; restricted adduction; no perceptible narrowing of palpebral fissure                | L., propulsion of globe; abduction 4 mm.  | Convergence to 8 cm.   | ?   | —   |

|    |                          |            |  |   |  |   |   |   |  |
|----|--------------------------|------------|--|---|--|---|---|---|--|
| 21 | Alving                   | F., 7, L.  | $R. = \frac{6}{6}$ c. correction<br>$L. = \frac{6}{6}$               | ?   | <p>L., retraction of globe; adduction 25°; narrowing of palpebral aperture</p>   | ? | <p>L., rotation inwards accomplished with difficulty?</p>                           | <p>L., broad thick tendon normally inserted; ext. rect. tendinous. Result: diminished mobility and retraction; cosmetic effect satisfactory.</p>  | <p>tendon thick and reaching down almost to inf. rectus, with some fibres inserted posteriorly. Temporary loss of retraction and lateral movements with propulsion and divergence; permanent loss of abduction; adduction and retraction somewhat restored; occasional diplopia.</p> |
| 22 | Alving                   | F., 7, L.  | $R. = \frac{6}{6}$ c. correction<br>$L. = \frac{6}{6}$               | ?   | <p>L., retraction of globe; adduction 25°; narrowing of palpebral aperture</p>   | ? | <p>L., rotation inwards accomplished with difficulty?</p>                           | <p>L., broad thick tendon normally inserted; ext. rect. tendinous. Result: diminished mobility and retraction; cosmetic effect satisfactory.</p>  | <p>tendon thick and reaching down almost to inf. rectus, with some fibres inserted posteriorly. Temporary loss of retraction and lateral movements with propulsion and divergence; permanent loss of abduction; adduction and retraction somewhat restored; occasional diplopia.</p> |
| 23 | Axenfeld and Schürenberg | F., 12, L. | $R. = \frac{6}{6}$<br>$L. = \frac{6}{6}$                             | <p>L., slight enophthalmos and diminished palpebral aperture; axes parallel; binocular vision</p> | <p>L., retraction of globe 5 mm.; adduction 5 mm.; palpebral aperture diminished from 9 to 3 mm.; lower lid bulged forward a little, upper lid sunk in a little; movement of eye up or down when looking above or below horizontal</p> | ? | <p>Accommodation good</p>   | <p>L., no abduction beyond middle line; homonymous diplopia</p>   | <p>L., int. rect. cut; normal insertion; retraction persistent; some adhesion found between Tenon's capsule and globe, but no definite 2nd intermus found. Result: retraction as before; divergence with crossed diplopia; ext. rect. normally inserted, but broad and fibrous.</p>  |
| 24 | Axenfeld and Schürenberg | F., 16, L. | $R. = \frac{6}{6}$ (emmetrop. each eye)<br>$L. = \frac{6}{12}$ prox. | <p>L., convergent 3-4 mm.</p>   | <p>L., retraction of globe; adduction about 3 mm.; diminished palpebral aperture</p>   | ? | <p>L., adduction without retraction easy; only slight rotation outward possible</p> | <p>L., int. rect. cut; normal insertion; retraction persistent; some adhesion found between Tenon's capsule and globe, but no definite 2nd intermus found. Result: retraction as before; divergence with crossed diplopia; ext. rect. normally inserted, but broad and fibrous.</p> | <p>tendon thick and reaching down almost to inf. rectus, with some fibres inserted posteriorly. Temporary loss of retraction and lateral movements with propulsion and divergence; permanent loss of abduction; adduction and retraction somewhat restored; occasional diplopia.</p> |

| a)  | (b)                      | (c)                | (d)   | (e)   | (f)   | (g)   | (h)   | (j)   | (k)   |
|-----|--------------------------|--------------------|---|---|---|---|---|---|---|
| No. | Observer                 | Age, Sex, and Side | Refraction and Vision   | Condition of Eyes in Primary Position   | Effect of Attempted Conjugate Movement towards the Unaffected Side  | Effect of Attempted Conjugate Movement towards Affected Side  | Effect of Attempted Convergence   | Effect of Passive Traction  | Remark  |
| 25  | Axenfeld and Schürenberg | F., 60, L.         | $R. \text{ c. } +\frac{10}{2} \ominus 180 = \frac{6}{6}$ $L. \text{ c. } +\frac{10}{2} \ominus 180 = \frac{5}{6}$ | Axes paral-<br>lel, diplopia<br>only after<br>extraction<br>of cataracts                        | L., slight retraction of<br>globe, with limited<br>adduction; lower lid<br>pushed slightly for-<br>ward   | L., no abduction;<br>diplopia   | ?   | L., some<br>difficulty<br>in ad-<br>ducting<br>and ab-<br>ducting<br>Adduction<br>easy; ab-<br>duction<br>not pos-<br>sible | L., ext. rect. tendinous and<br>lying closely on bulb;<br>elasticity of band slight.  |
| 26  | Evans                    | F., 7, L.          | $R. \text{ c. } +\frac{50}{2} \ominus 90 = \frac{6}{6}$ L. = Fingers at 1<br>metre (emmetropic)                   | L., slight con-<br>vergence,<br>enophthal-<br>mos, and<br>narrowed<br>palpebral<br>fissure      | L., retraction of globe,<br>with restricted ad-<br>duction; palpebral<br>aperture diminished;<br>rotation of the eye-<br>ball downwards ex-<br>cept when looking<br>up and to the right | L., propulsion of<br>globe; widen-<br>ing of palpebral<br>aperture; no ab-<br>duction beyond<br>middle line               | Convergence<br>replaced by<br>conjugate<br>movement<br>to left,<br>which gives<br>same result<br>of propul-<br>sion, &c.  | Adduction<br>easy; ab-<br>duction<br>not pos-<br>sible  | L., int. and ext. recti in-<br>serted far back; int. rect.<br>thick and short, ext. rect.<br>tendinous and function-<br>less. |
| 27  | Evans                    | M., 7, L.          | R. Em. = $\frac{6}{8}$<br>L. Em. = $\frac{6}{12}$   | L. R. more<br>deeply set<br>than R.,<br>and palpe-<br>bral aper-<br>ture slight-<br>ly narrower | L., slight retraction,<br>with restricted ad-<br>duction; narrowing<br>of palpebral aper-<br>ture; diplopia   | L., propulsion of<br>globe; widen-<br>ing of palpebral<br>fissure; no ab-<br>duction beyond<br>middle line; di-<br>plopia | Convergence<br>replaced by<br>conjugate<br>movement<br>to left and<br>its accom-<br>paniments;<br>no associ-<br>ated pupil<br>reflex on<br>attempting<br>conver-<br>gence | Adduction<br>easy; ab-<br>duction<br>beyond<br>middle<br>line im-<br>possible   | Slight impairment of up-<br>ward movement in each<br>eye; lateral movements<br>of right eye slightly re-<br>stricted.         |

fair to assume that the defect is one which implicates the muscles themselves, for no purely nervous lesion can account for the retraction movement of the globe, even though it might explain the loss of abduction.

Two theories have been advanced by Türk to explain cases of this kind. Julius Wolff gives the following account of them :—

“According to the *faulty insertion theory* the retracting muscle, which is the internal rectus, is attached to the eyeball farther back than normal. Consequently the portion of muscle capable of unwinding itself from the globe is diminished and inward rotation is correspondingly replaced by a backward pull on the globe when the internal rectus contracts.” The other is known as the *fixation theory*. “In advancing this theory Türk assumes that the paralysed external rectus consists of an unyielding connective tissue strand in place of elastic muscle fibres. This fixes the eyeball on its outer side and offers an obstacle to adduction so that the eye can yield to the traction of the internal rectus only by moving back into the orbit at the same time that it turns inwards.”

Wolff favours the fixation theory and thinks it more in accord with the clinical manifestations of most of the cases of retraction movements. It is of the utmost importance to decide in each individual case what is the actual structural defect, for in the adequate appreciation of this will rest the success of the treatment. Passive traction of the eyeball outwards and inwards with forceps will demonstrate whether there is any obstruction to external or internal rotation. The presence of an unyielding external rectus would explain limitation of passive rotation inwards, but it is difficult to see why it should prevent rotation outwards. But I doubt if it is necessary to adopt the fixation theory to explain either of these limitations. It seems to me that most—if not all—the cases might be explained by

a theory of faulty insertion of the internal and external recti, and I would also include a mal-development of the latter and an abnormal shortening and diminished elasticity of the former. The substitution of the external rectus by a fibrous band and its erratic insertion into the globe have been definitely proved by exploration in several of the cases recorded. Such a band, if somewhat short, would restrict passive movements inwards. Shortening and diminished elasticity of the internal rectus is shown by the restriction of passive movement outwards and by its fibrous appearance and its inextensibility on exploration.

In some cases other muscles appear to be inserted too far back. This would explain the limitation of movements in planes other than the horizontal. In Heuck's case practically all the muscles of the eyeball were badly developed and inserted abnormally. Faulty development of a muscle appears to be associated with its faulty insertion. Primarily the internal and external recti seem to be defectively developed and this has resulted in a faulty insertion.

In those cases in which the muscle or muscles have been found inserted normally the retraction may be caused by an accessory portion inserted farther back. It is evident that the farther back the muscle or its accessory band is inserted the greater the amount of retraction and the less that of adduction. Such bands have been noted even in cases where the main portion of the muscle was abnormally inserted.

The presence of some muscular fibres in the external rectus in my first case suggests the possibility of a fibrous degeneration from want of use and the desirability of early operation and other treatment so as to give the muscle a chance of developing.

The constant enophthalmos occasionally noted in the primary position Wolff ascribes to the normal tonus of the internal rectus which, in conjunction with

the shortened and unyielding external rectus, suffices to hold the eye in the retracted position. I am inclined to regard the enophthalmos as a sign of a short internal rectus as well as of a short external rectus.

The propulsion of the globe during attempted conjugate movements towards the affected side represents the full relaxation of the internal rectus. The same changes take place with attempted convergence for the reason that it is replaced by conjugate movement towards the affected side. The power of convergence is not absent in all cases, but in those cases in which convergence was present there is no record of the occurrence of propulsion of the globe during the act. It is difficult to explain why convergence should be absent in most of the cases. The upward or downward rotation of the globe during retraction seems to be satisfactorily accounted for by the resistance of the optic nerve acting in a plane below or above the horizontal.

In the treatment of these cases it should be the surgeon's first duty to expose the tendons of the external and internal recti. If their insertions are seen to be normal and no accessory bands are found inserted farther back, then the symptoms may be considered to be due to fixation of the globe by a fibrous external rectus and dealt with accordingly.

On the other hand, if the insertions be found too far back, or accessory bands be discovered behind a normally inserted main tendon, then the case should be dealt with on the faulty fixation theory. In such a case it would be necessary to lengthen as well as advance the tendon of the internal rectus. Advancement alone, even if it were possible, would result in the production of a convergent strabismus without much alleviation of the retraction.

If there is any interference with passive rotation inwards of the globe the external rectus tendon should

also be divided. If for any reason such an operation should be thought undesirable, and especially if there is convergent strabismus in the primary position, it might be worth while to try the effect of tenotomy of the internal rectus. This should result in slight lengthening of the tendon with diminution of the retraction movement, but unfortunately also in increased limitation of the power of adduction. It is, however, questionable whether the slight diminution in retraction is worth obtaining at the expense of impaired adduction unless the retraction causes distressing subjective symptoms. In my case the result of tenotomy was very temporary, and it had no appreciable permanent effect on any movement.

Further records of cases may help to throw light on the pathology and treatment of these cases; at present we must assume that one or other of the theories advanced will explain the symptoms, but each case should be thoroughly investigated before any treatment based on either theory is adopted.

I append an analysis of the cases hitherto published.

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## CASE OF GLIOMA OF THE RETINA SIMULATING HYPOPYON.

BY WALTER H. JESSOP, M.B., F.R.C.S.

THE following case is interesting from the fact that I cannot find one recorded like it. The plates illustrating the paper are from microscopical specimens prepared by Mr. Brewerton and photographed by Mr. Norman.

T. C., a boy, aged 4, was admitted into the Ophthalmic Wards of St. Bartholomew's Hospital on October 29, 1900. The mother states that the right eye has been looking "queer" for some months.

The diagnosis of the doctor sending him up was "traumatic iritis," but no definite history of an accident can be made out. He is a rosy-cheeked, well-nourished boy, has a right inguinal bubonocoele, but otherwise healthy. He complains of pain in the right eye. The left eye is normal in every respect.

*Right Eye.*—Slight congestion of conjunctival and sclerotic vessels. The cornea presents a small, transversely placed scratch staining with fluorescine, slight general steaminess, and some vascularity below. Anterior chamber shallow, contains small quantity of milk-white fluid gravitating to its lower part; this moves freely with the position of the child's head. The iris is greenish-blue in colour and slightly muddy-looking. The pupil is dilated 7 mm., does not react to light; this dilatation is probably due to atropine. The edges of the pupil are shaggy, as if lymph were present, but there are no posterior synechiæ. By oblique illumination the pupil has a yellowish colour, which was thought to be due to opacity of lens. The lens is apparently opaque and giving a greyish yellow appearance. Tension normal. Vision = p. l. The eye painful and tender. The diagnosis was traumatic cataract with hypopyon following a wound of the cornea. The white colour

of the hypopyon and the slightrness of the ciliary congestion were noted.

*November 4.*—Condition of eye the same—still “hypopyon.”

*November 9.*—Paracentesis of the anterior chamber under cocaine, and some yellowish-white fluid evacuated; cultivations were taken, but proved sterile.

*November 12.*—Considerable ciliary congestion, the wound healed, and anterior chamber re-formed.

*November 13.*—The “hypopyon” again present and great ciliary congestion; there is much pain in the eye and tension + 1.

*November 14. Right Eye.*—A shallow vertical central corneal ulcer about 3 mm. long by 1.5 mm. wide, staining with fluoresceine, appeared without any known cause; no “hypopyon.” Eserine drops ordered.

*November 16.*—Ulcer healed; the “hypopyon” for some days has been sometimes present, and at other times not.

*November 20.*—The patient had more pain, still considerable ciliary congestion; no “hypopyon.” Pupil dilated, does not act to eserine. Still yellowish reflex in pupillary area. Tension varies from + 1 to + 2. Under chloroform paracentesis to relieve the tension, but only clear fluid evacuated. The condition was now thought to be pseudoglioma in contact with the posterior capsule of the lens.

*December 7.*—Until three days ago the symptoms have much improved, but since then there has been severe pain again and high tension. The right eye looks the same, some ciliary congestion and a small amount (1 mm. deep) of whitish fluid in the anterior chamber. Tension + 2. Under chloroform the right eye was excised with 4 mm. of the optic nerve, which was greatly enlarged. On cutting into the eye a growth was found, which on microscopical examination proved to be glioma, the nerve also containing glioma cells.

*December 11.*—Exenteration of orbit was performed, the periosteum being separated from the orbital edge backwards, and 9 mm. of the optic nerve removed. The wounds healed well and with little pain.

January 12, 1901.—The patient went out quite well to the Sevenoaks Infirmary. In the middle of February, Dr. Ward wrote that the patient suddenly became unconscious, and remained so for some days, but recovered consciousness; evidently suffering from intracranial trouble (torpor, slow pulse), there is some recurrence in the orbit. The other eye seems natural.

March 7, 1901.—The patient died. No *post-mortem* examination. Rapid growth in orbit for past week, symptoms of increasing intracranial pressure.

*Pathological Report by Mr. Brewerton.*—The eye divided vertically from before backwards; it was generally enlarged; length 23.5 mm., width 22 mm. *Cornea*: Central nebula in the site of old ulcer and no cell infiltration; anterior chamber shallow. *Iris*: The iridic angle obliterated, no posterior synechiæ; *lens* clear; *vitreous* almost entirely disappeared; *ciliary body* slightly enlarged, and when magnified with a high pocket lens, small white granules were found on anterior part of ciliary processes (balls of tumour cells). *Retina* completely detached, showing a cheesy looking growth of an exophytic character, nearly filling the interior of the vitreous chamber; the *choroid* is 2 mm. thick, the greatest thickness being near the disc; the optic nerve is enormously thickened.

*Microscopical Examination.*—The chief mass of the growth consists of small round cells with many thin-walled blood-vessels: these cells appear to be the nuclei of large degenerated cells; they show no surrounding protoplasm and stain badly and slowly. In the areas of degeneration there are colloidal masses. No rosettes nor worm-like processes round blood-vessels to be found. The growth looks like a degenerating sarcoma. The choroid is densely crowded with tumour cells showing, in many places, well-marked nuclei. The ciliary processes are also infiltrated with the cells, and anteriorly in the posterior aqueous chamber are small balls of these cells resting on their surface, probably derived from the anterior aqueous chamber, as the epithelium of the ciliary body is intact. The iris is also infiltrated, especially near its base, and ante-

riorly the cells have burst through the endothelial lining of the iris into the anterior chamber, and from thence have passed through the pupil into the posterior chamber; the pupillary margin is regular; there are no signs of posterior synechiæ nor of pigment on the anterior capsule of the lens. The anterior chamber contains small balls of cells which stained fairly well, these being the same size as the tumour cells elsewhere, and were the cause of the apparent hypopyon. The optic nerve is about twice the natural size, the centre is composed of necrotic glioma cells, the peripheral portions showing cells which stain readily; the end of the nerve removed after exenteration is also infiltrated with tumour cells; the rest of the orbit is healthy.

The chief points of interest in this case are the simulation of hypopyon by the glioma cells, the verification of these cells in the anterior chamber, the infiltration of the uveal tract from behind forwards with the tumour cells, and the difficulty in the diagnosis. I can find no account of a similar case to this, though Winstersteiner in his monograph on *Das Neuro-Epithelioma Retinae*, p. 74, mentions that a sediment is present occasionally in the anterior chamber in glioma cases which looks very like hypopyon.

In fig. 2 there is shown the tumour cells emerging from the iris in a ball-like mass, and also the cells free from the iris tissue. The cells were found in the anterior aqueous chamber and also in the posterior chamber lying on the epithelium of the ciliary body. The mere fluid part of the sediment was due to the detritus of the cells.

The presence of the "balls" of cells in both the anterior and posterior aqueous chamber account for the disappearance at times of the "hypopyon," as the deposit apparently passed through the pupil into the posterior chamber. This was possible from the absence of posterior synechiæ. (Some years ago I had under my charge a case exhibiting in an old blind eye chole-



FIG. 1.—Showing infiltration of the iris near its base with tumour cells; the pigment epithelium has been detached in preparation.  $\times 85$ .



FIG. 2.—The iris nearer the pupillary margin than fig. 1, showing infiltration with cells, and the cells bursting through endothelium in front as small balls of cells, to form the deposit in anterior chamber.  $\times 85$ .



terine in the aqueous chamber. On the patient lying down for a few minutes most of the cholesterine in the anterior chamber disappeared, but on the patient raising his head a stream of spangles of cholesterine passed through the pupil into the anterior chamber. This condition lasted for some months, but an attack of iritis, followed by posterior synechiæ, stopped the display.) The uveal tract was infiltrated with glioma cells throughout ; the choroid was the most affected, being twice as thick as usual. The iris, as seen in fig. 1, was also much increased in size.

The diagnosis in this case was rendered very difficult by the incomplete previous history, the probability of traumatism, the presence of corneal ulceration on two separate occasions, the disappearance at times of the "hypopyon," the alterations in the intraocular tension, the changes in the substance and appearance of the iris, though posterior synechiæ were absent, and the growth filling the vitreous chamber, so that the lens looked opaque.

Lastly, the case illustrates the clinical history and pathology of glioma in the extraocular stage when even in the eyeball all trace of structural arrangement is lost, and the disease has the aspect of a round-celled sarcoma. There are no rosettes, no alveolar arrangement, and not even the worm-like processes consisting of a blood-vessel surrounded by a mantle of cells twenty or thirty deep.

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## REVIEWS.

RÖMER and O. DUFOUR (Würzburg). Influence of the Sympathetic upon Accommodation. *v. Graefe's Archiv für Ophthalmologie*, liv. 3.

Every now and again the question of the influence of the sympathetic upon accommodation crops up : in 1891 for example. Morat and Doyon showed that after division of the sympathetic there was a diminution in the size of the anterior crystalline images, while they were augmented on stimulation of the nerve. From this the observers concluded that one might regard the sympathetic as exercising an inhibitory influence on accommodation, as having an antagonistic action to the third nerve. They say that there are two nerves dealing with accommodation ; the oculomotor, which adapts the eye for near objects, and the sympathetic, which adapts it for distant objects. Other observers have been found to agree with these results, but Langley and Anderson, as well as Hess and Heine, are of a contrary opinion. Hess showed that if one by means of a weak current kept up contraction of the ciliary muscle in a dog, and during the flow of the current applied a vigorous stimulus to the exposed sympathetic, the pupil dilated widely at once, but the indicator showed no diminution whatever of the contraction of the ciliary muscle. The diminution in refraction which apparently sometimes does occur under these conditions is to be attributed, according to Hess and Heine, to the disturbing influence of the more peripheral portions of cornea and lens which is made possible by the dilatation of the pupil. With these views Dor was unable to agree, and the authors have set themselves to endeavour to clear up the matter under the guidance of Prof. Hess. Two points required, in their opinion, special attention : the admitted alteration in refraction, as shown by retinoscopy, after stimulation of the sympathetic, and the change in size of the images on the lens which Dor asserted to take place. As regards the



first point, the admitted alteration in refraction in certain instances on dilatation of the pupil is not necessarily due to any actual change in the lens ; and in reference to the second point, the difficulty of being quite certain of an increase or diminution in the size of the very small images on the surface of the lens is extremely great. Morat and Doyon state that the image may enlarge by as much as a third or even a half of its own diameter, and in the case of one cat examined the image almost doubles its size ; now in man, at all events, an alteration in size of slightly less than half has been shown to correspond to a change in refraction of 7 D., immensely greater than the alteration in refraction admitted by Hess and Heine. The authors of the present paper do not, moreover, find that close relationship to exist between the pupil dilatation and the alteration in size of the images on which the French observers have laid considerable stress. These also, in the course of their experiments, employed a needle, with indicator attached, introduced into the anterior chamber and so applied to the lens surface that any alteration of its anterior curvature would be at once indicated by the movement of the needle ; putting the oculomotor nerve first in action and then stimulating the sympathetic, they observed a distinct indication of diminution of curvature of the crystalline. But the present authors, who have repeated the experiments, directly traverse this statement ; they found no such evidence of change of curvature, and the needle inserted in the ciliary muscle showed also no interference with its state of contraction when the sympathetic was excited. Especially in experimenting with the rabbit, unless great care was taken, the needle was apt to touch the iris, when, of course, it would move on dilatation of the pupil by stimulation of the sympathetic ; and even without actual contact of iris and needle, for the motion of the iris was capable of setting up currents in the aqueous humour which could cause the needle to sway. The experiments were repeated in dogs, which have a much more efficient ciliary muscle, the external muscles were all divided as a preliminary to prevent any error from that

source, and the results were direct contrary to those of Morat and Doyon. In other words, Römer and Dufour do not find that the sympathetic has any power of causing negative accommodation.

Their paper was hardly finished when that of Terrien and Camus (see *OPHTHALMIC REVIEW*, 1902, p. 318) appeared; it is curious that these last find that stimulation of the sympathetic produces not a diminution but an increase in accommodation.

W. G. S.

A. S. PERCIVAL (Newcastle). *Notes on Optics.*  
*London: Simpkin, Marshall, Hamilton, Kent and Co., Ltd.*

This pamphlet of 30 pages contains a useful *résumé* of the principal problems of optics encountered by the ophthalmologist. It is abstracted by Mr. Percival from his larger work on Optics, with, however, different conventions for signs. The explanation of the latter occupies an undue amount of attention, since the complex character of some of the problems presumes a somewhat extensive knowledge of mathematics. Used as an adjunct to class teaching, the book will be invaluable.

And this, indeed, we consider the most encouraging feature about this little work. The Notes "are published primarily for those post-graduate students who attend my lectures and demonstrations on Ophthalmology." We are glad to hear of one centre of ophthalmology in England where systematic lectures upon optics are given. Such an important branch of our subject has so long been left to the unaided efforts of the individual, that other schools of ophthalmic teaching may well copy this good example.

OHLEMANN (Wiesbaden). *Die Neueren Augenheilmittel.* J. F. Bergmann. 1902.

It is very convenient to have in small compass and without the labour of hunting through innumerable journals, a succinct account of the nature, dosage, mode

of use of, and indications for, the employment of each of the numerous recent additions to the pharmacopœia of the ophthalmic surgeon. This want is supplied by Ohlemann's little book, in which one can find all that he can wish to know regarding protargol, acoin, dionin, the giant magnet, ichthyol, the X-rays, and a hundred other matters of greater or less importance. The information is, of course, largely of ephemeral value, for the modes of treatment will either very shortly become common-places, or will drop out altogether ; but for the meantime a surgeon will find it handy to have those references within easy reach.

## OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

FRIDAY, NOVEMBER 14, 1902.

Mr. STANFORD MORTON in the Chair.

### CASES.

*A Case of Sympathetic Ophthalmitis with Cystic Changes in the Iris.*—Mr. W. H. H. Jessop. The patient, a youth, aged 16, had his right eye damaged by a pitch-fork being driven into it nine years ago ; he was not attended by a doctor at the time, and had been blind in this eye ever since. He never remembered having any inflammation in his left eye until two months ago, when it began to run with tears and to ache very much ; at the same time his right eye began to pain and became bloodshot ; he also noticed that the sight in the left eye was not so good as formerly and this condition has steadily become worse.

The right eye on examination appeared inflamed, the conjunctival vessels congested, the lids slightly red and swollen, the eyeball itself shrunken and squarish in form, tender on pressure and soft, T. — 3. The cornea small, opaque, and in its centre a yellowish horizontal patch of degeneration.

The left eye was very tender, the lids normal, conjunctival vessels congested, with a slight circumcorneal zone of redness, and photophobia ; the cornea clear, but showing numerous posterior punctate spots ; the iris thickened, spongy and honeycombed in appearance ; the pupillary margin depressed and irregular ; under

atropine the pupil dilated irregularly. At the periphery of the iris on the outer side were seen two rounded, raised swellings; on the nasal side also were two corresponding swellings, but not quite so large as the others; these swellings being raised about 1 mm. from the rest of the iris tissue and covered with thinned-out iris. The tension of the eye was quite normal, and  $V. = \frac{6}{12}$  with correcting lens. The right eye was excised and found to be a shrunken, atrophied globe. Mr. Jessop considered that these swellings were cysts of the iris similar to those described by Mr. Treacher Collins, but he had never before known them to occur in sympathetic ophthalmitis.

*A Case of Congenital Ophthalmoplegia.*—Mr. G. W. Roll. The patient, aged 7, had had nystagmus since birth, more marked with the left eye than the right. The right eye showed slight ptosis, the globe itself appeared smaller than the left, and the upward and downward movements were practically *nil*, while some slight movements inwards and outwards could be made out. The pupil was in a condition of medium dilatation, with doubtful reaction to light. The left eye showed better movements in all directions, and its pupil was active to light and accommodation. The patient was the youngest of six, two of whom died in infancy.

*Two Cases Illustrating a Form of Fissura Facialis.*—Mr. N. Bishop Harman. Both the patients, one a girl, the other a boy, were under 5 years of age, and in both it was noticed that there were small holes near the inner canthus of each eye. There was no history of either inflammation of this region or of any discharge from it. The fissures were patent to the extent of from 3 to 5 mm., and in one child on one side only was it possible to syringe through the fissure into the lachrymal duct, and through to the nose. With the exception of this defect, in both children the tear passages were normal. These two patients were not related, but were born within a few months of each other, and by a curious coincidence in the same block of houses. The mother of the girl patient had a similar condition on the right side, which had never been noticed until she was 7 years of age, and had remained entirely quiescent until she was 20, excepting that it slightly swelled and sometimes discharged at each menstrual period. Subsequently, however, it became irritated, and at the present time there is a thickened lump to be felt. This apparently did not affect the lachrymal apparatus, since there was neither mucocele nor epiphora. Mr. Harman had only been able to find one other similar case in the literature on the subject, that reported by Agnew, of New York, in a child, aged 3, in whom the tiny pore would not

have been noticed except for the presence of a small drop of clear exudation, for there was no depression to mark the opening. Sperling, of Königsberg, had reported a case with large holes in this region communicating with the cranial cavity, which points to the condition not being in any way in connection with the lachrymal apparatus, but a real remnant of fissura facialis.

Mr. Treacher Collins said it was interesting to note that the sinus in all three cases shown was situated at about the same distance from the inner canthus, the position in which the "lachrymal sinus" is located in some animals, *e.g.*, stags and antelopes. The lachrymal sinus in these animals forms a depression a short distance from the inner canthus and secretes an oily fluid. The lining membrane of the sinus is composed partly of sebaceous glands.

*Idiopathic Paralysis of the Sympathetic.*—Mr. Arnold Lawson. The patient was a woman giving a history of two years' duration of this paralysis, to account for which there appeared absolutely no assignable cause. The paralysis was on the right side; the right eyeball was distinctly less prominent than the left, and the tension of the globe somewhat lower than that of the other eye. The right pupil was contracted, not reacting to cocaine, but reacting readily to atropine. The vision in both eyes was  $\frac{5}{6}$ . The thyroid appeared normal, and there was no other swellings or scars in the neck.

*An Unusual Form of Nystagmus.*—Mr. E. W. Brewerton. The patient, a girl, aged 22, showed a varying amount of horizontal nystagmus, which at times was almost imperceptible; the right eye was divergent. All movements appeared normal, except convergence, but were carried out in a somewhat jerky manner. On covering the right eye well-marked horizontal nystagmus was at once produced, greater in the right than in the left, and when the left (the fixing eye) was covered the nystagmus became extreme, but also greater in the right than in the left. The vision was: R.  $\frac{6}{6}$ , L.  $\frac{6}{6}$ , but with both eyes together it rose to  $\frac{8}{8}$ ; the fundus in each eye was normal. The patient stated that both the strabismus and nystagmus are increasing. The history of the case showed that the nystagmus first became apparent some three years ago, after having had a fit of some kind, in which the patient was unconscious for two hours. The strabismus had been noticed before this attack.

*Congenital Paralysis of Both External Recti.*—Mr. H. B. Grimsdale. The patient, a girl, aged 6, when looking straight

in front of her, showed no deviation whatever, but when looking to one or other side it at once became noticeable that the external recti were inactive. Either internal rectus not only caused rotation of the globe, but by pulling it back into the orbit caused slight enophthalmos and ptosis. Refraction was slightly hypermetropic, and there appeared to be uncertain binocular vision. The mother had noticed what she called a squint since the child was 2 years of age, about which time the child underwent an operation in Guy's Hospital for some cystic tumour in the occipital region.

*Associated Movements. Spasmodic Lid Movement associated with Contraction of Muscle of Jaw.*—Mr. G. W. Roll.—The patient, a girl, aged 7, showed slight alternating convergent strabismus and slight ptosis of the left upper lid. When opening the mouth, and at the same time looking down, both upper lids make a movement upwards, sometimes in a jerky manner. When opening the mouth simply the lid movement does not occur; only when the patient looks down. This condition of association of movements has always been present since the child was at the breast.

#### PAPERS.

*On the Necessity for the Use of Colour-names in the Test for Colour-blindness.*—Mr. F. H. Edridge-Green. As an introduction to the paper, Mr. Edridge-Green stated "that there was no fact which can be more easily demonstrated than the absolute necessity for the use of colour-names in a test for blindness. Such, however, is the influence of authority that it is exceedingly difficult to convince men who have held the opposite opinion without giving them a practical demonstration." The writer considered that the first requirement for a test for colour-blindness was that the colour-names, red, yellow, green, blue, should be understood and employed by the examinee, and gave it as his opinion that no test which ignored colour-names could be efficient. He said he had predicted that if colour-names were ignored in the Board of Trade tests, normal-sighted persons would be rejected, which has proved to be the case, since over 38 per cent. one year and 42 per cent. in another year of those who appealed against their rejection on account of colour-blindness were found to be normal-sighted and to have been wrongly rejected. Mr. Edridge-Green pointed out that in the case of an engine-driver or sailor, what he requires to do is to *name* the coloured light he sees, and not to match it. He must reason to himself: "This is a

red light, therefore there is danger"; hence the value of colour-names. In order to show how normal-sighted persons are rejected by ignoring colour names, the writer cited the following case: "A man was sent to me as colour-blind. On examining him I found he was normal-sighted. I then examined him with Holmgren's test, carefully adhering to the directions. He put several confusion colours with the test green, but no greens. In answer to my enquiry he said they were all of the same colour. I then said, 'Are they all greens?' He replied, 'No they are not. That is a purple-brown, that is a grey, and that is a yellow. You did not tell me to put only greens with the wool you gave me, you said, 'Pick out all of the same shade or colour.'"

Thus he considers the method of matching colours should, in order to be efficient, be one of mentally naming them. In all his tests for colour-blindness, he first makes certain that the examinee understands what is meant by colour, then makes him name a colour, and the essential point is that colour-blindness is shown by a person including two colours of the normal-sighted under one name. He then went on to describe his method of examination with the spectrum, pointing out how the colour-blind and colour-weak make the limits of the colours merge more or less into the next colour in the spectrum as seen by the normal-sighted. In conclusion, Mr. Edridge-Green gave his definition of the colour-blind, stating that they may be divided into two classes. The first class includes those who are not able to see certain rays of the spectrum, their spectrum being shortened at one end or the other, or at both ends. If a person has shortening of the red end of the spectrum he will not be able to see a red light at a distance, though he might still be able to pick out all the green wools in the classification test. The second class make mistakes, not because they cannot perceive a certain colour, but because they are not able to recognise the difference between the colours which is evident to normal-sighted persons. He compares the errors made by those in the two classes with those due to the varying perceptions of sounds, persons in the first class being represented by those who are unable to hear very high or very low notes; those in the second class by those who possess what is commonly called a defective musical ear.

Mr. Devereux Marshall considered Mr. Edridge-Green had made out a very clear case in favour of his views on colour-vision and for the use of names for the colours when testing. It was true, he said, that an engine-driver or a ship's look-out did not require to match colours at night, but on a pitch-dark night, in a thick atmosphere, the look-out had to see a dull red light, or

a green light, in the distance, which, perhaps, if the observer's spectrum was shortened on the red side, he would not see. He thought such cases must inevitably cause disaster, and probably accounted for a large number of the shipping accidents which occurred.

Mr. Holmes Spicer enquired what was a reliable method of testing for colour vision?

*Avulsion of the Eyeball by Midwifery Forceps.*—Mr. Simeon Snell. In June of this year Mr. Snell had examined a baby, one day old, which had been brought into the Sheffield Royal Infirmary with the left eyeball hanging out on the cheek and still connected with the orbital tissue by bands of conjunctiva. The child appeared to suffer no pain. There was a mark as of forceps above the left eyebrow, and facial paralysis on the right side affecting only the lower half, the lids escaping. The optic nerve was found to have been torn through, leaving fully an inch attached to the eyeball; the eye was accordingly freed from the conjunctival tissue which held it. The birth had been a very difficult one, with the head jammed in the pelvis for some hours, and the labour was only terminated after considerable traction had been exerted with the forceps. A few weeks after this first case another child was admitted to the hospital who, after a difficult forceps delivery, showed a much swollen and protruding conjunctival swelling between the left lids, which finally sloughed without the eyeball being in any way affected.

*Paralysis of Upward Movement of both Eyeballs.*—Mr. Simeon Snell. The patient, a man, aged 50, gave the following history. After returning home from work at 5 p.m. one evening, and having his tea, he fell asleep in an easy chair while smoking, and never remembered anything until 4 a.m. the next morning. His wife called him three times during this time, but he remembered nothing whatever about it. At 4 a.m., when he awoke, he felt very giddy and experienced some difficulty in standing; his wife assisted him into the next room, where he went to bed and fell asleep immediately, remaining so till 8 a.m. When he awoke he had severe pain in his forehead, and objects appeared double. There was no sickness. He was very giddy and had to be assisted to walk; this lasted for about a week, then it gradually passed away. He stated that when looking in front of him everything appeared double, one image being above the other. Later on he imagined he was a little deaf in the right ear, but his hear-



ing seemed equal on both sides; the double vision had persisted. The movement of the eyes inwards, outwards and downwards were normal, but the eyes could not be raised upwards, either together or separately. When he made an effort to look upwards the eyeballs did not move, but the eyelids made the normal elevation, leaving a rim of sclerotic visible above the cornea. The vision was  $\frac{5}{6}$  each eye and Jæger 1. The pupils reacted normally. The other reflexes were normal. First the diplopia disappeared, but the inability to move the eyes upward continued; later on this passed away, and within two months of the time of onset the paralysis of upward movement had entirely disappeared. The treatment throughout consisted of the internal administration of potassium iodide.

The writer referred to a case mentioned by Gowers, in which paralysis of the upward movement of the eyes was present without any affection of the levator of the lid. In the *post-mortem* examination of this case a very small tumour was found in the middle line behind the posterior quadrigeminal bodies. In remarking upon this case, Gowers pointed out that "paralysis of the upward movement of the eyes has often been observed in cases of central disease, associated with paralysis of the levators. It is possible that there is also a higher centre, disease of which may paralyse the upward movement without the lid, since this isolated symptom may be met with." Mr. Snell considered that the presence of diplopia, indicating an unequal involvement of the two eyes, rather suggested the lesion being a nuclear or basal one.

Dr. Aldren Turner considered the lesion to be a vascular one from the suddenness of its onset, but whether the lesion was limited to the quadrigeminal bodies, or whether it affected both those and the oculo-motor nuclei, he did not think there was sufficient evidence to show. Paralysis of the upward movements of the eyeball was one of the classic symptoms of lesions of the quadrigeminal bodies. The point in favour of the supposition that it was a lesion limited to the quadrigeminal bodies was the presence of giddiness and unsteadiness which were observed at the onset in the present case. He understood that that had now passed away, and the patient was able to walk without assistance.

Mr. Marcus Gunn drew attention to the fact that in examining the upward movement of both eyes it was important to draw a distinction between the power of the patient to look upwards if he were merely asked to do so, and his power of looking upward if an object were given him to look at.

*Retinitis Pigmentosa in Five Generations.*—Mr. Simeon Snell. A man, aged 46, came to consult Mr. Snell at the Sheffield Royal Infirmary, in 1902, with a typical history of night-blindness and failing sight, and with the characteristic appearance of the fundus of a case of retinitis pigmentosa. Since childhood he had not been able to go about in the dark and had never seen the stars. On enquiring into his family history it was found that large numbers of the other members of the family were similarly afflicted with night-blindness.

The patient's great-grandfather went stone-blind and died in old age; he left a daughter, an only child, who suffered from night-blindness, and became blind at 30 years of age; she left six children, of whom four were afflicted and two not; it is through her that the numerous family, represented on a chart of the family which Mr. Snell had prepared, and which he showed to the Society, was descended. The patient was the father of eleven children, seven of whom are afflicted and four normal. His father had an equally large number of children, five of whom were afflicted and six not. The night-blindness appeared in all instances to have shown itself in early childhood when the children began to walk about. At about the age of 40, or rather more, the affected ones have become practically blind. The chart showed that out of the total number of relatives, sixty-seven in all, twenty-eight were afflicted and thirty-nine not. Out of these it is certainly known that fifteen were female and ten male, the sex of the other three being uncertain. The hereditary tendency of the nyctalopia descended in all the instances without a break, no generation being skipped over, and it ran equally through the female and male lines. In no instance was there any evidence of consanguinity of marriage.

The Chairman said he thought it was very interesting on account of the large family history, and especially so from the absence of any history of consanguinity. He himself had frequently been struck by the infrequency of any such history.

REGINALD E. BICKERTON.

## THE TREATMENT OF MYOPIA.

BY R. LIEBREICH, Paris.

BEFORE speaking of myopia, I have to make some observations about the orbit, and the influence of its form and position upon anomalies of refraction and upon strabismus. The results of my researches upon this question differ from those published until now. This difference depends chiefly upon my considering it a mistake to take *the whole orbit* into account for measurements and statistical researches.

A vertical plane passing through the centre of rotation of the eyeball and the centre of the foramen opticum will divide the orbit into two very different portions, the larger temporal and the smaller nasal half. It is this latter one only that, according to my researches, should be taken into consideration. It is only the nasal side of the orbit which bears a constant relation to the centre of rotation and the muscles of the eyeball. On the temporal side, on the contrary, this relation undergoes many variations. The nasal halves are, excepting some pathological cases, symmetrical, while the temporal halves are always asymmetrical.

The innumerable modifications of form, size, and position of the cheek-bone, though they alter considerably the appearance of the face, have fortunately no influence upon the position of the eyeball, otherwise we would constantly have the greatest difficulty in combining the two eyes; as in my experience the two cheek-bones are never symmetrical. I have interested myself in this both from an ophthalmological and from an artistic point of view, and my conclusions are based upon researches made during

many years on the living subject and on measurements of several thousand skulls. The splendid collection of skulls in the Muséum du Jardin des Plantes in Paris offers, above all collections which I have visited, the best opportunity for such researches. One can easily confirm there the following statements:—

(1) There exists a certain asymmetry in all human faces, without exception, dependent upon difference between the two cheek-bones. This asymmetry shows the same conditions in all skulls of all races in all parts of the world, appears already in the new-born, and even in the embryo, can be seen in cases of microcephalus as in cases of hydrocephalus, and even in those skulls artificially made pointed by compression. This asymmetry must be considered as normal and characteristic of the human species. In all different kinds of apes the two cheek-bones are symmetrical. The human cheek-bones, on the contrary, are on the right side more rectangular, on the left side forming a flatter arch, which recedes backwards, and frequently at the same time slightly upwards. This produces a difference between the borders of the two orbits, but only of the temporal part of these orbits, while the nasal part not influenced by those differences in the cheek-bones remains symmetrical.

(2) Of quite different a nature are those exceptional asymmetries with differences in the upper jaw, frontal and temporal bones. They are abnormal, and having an influence even upon the nasal part of the orbit, produce differences of height of the two centres of rotation of the eye, and great difficulties in the way of binocular vision.

Asymmetry of the whole body has lately been considered as a normal condition by E. Rollet and J. van Bierbliet in *L'homme droit et l'homme gauche*. I can confirm this as regards the cheek-bones and the shape of the face; for the position of the eye and for those bones of the skull influencing this position, however, I must deny this asymmetry.

A mistake I often find to be made is the quotation of the Venus of Milo in order to prove that asymmetry was

known to the Ancients. Examining this question, I may state first that the asymmetry of the face of the Venus de Milo is to be seen in all statues of the Greeks as well as of the Romans in which the head is turned sideways. Secondly, that the asymmetry is the more pronounced the nearer the position in which the head has to be seen approaches the profile; wanting, on the contrary, when the face has to be seen in front. Thirdly, that it exists only in statues placed in temples or niches so as to be looked at in a determined direction, but not in those to be looked at from all sides, for instance in public places. But above all, I must state, fourthly, that this asymmetry used in art has absolutely nothing to do with the natural asymmetry, but constitutes in a regular way a principle by which ancient sculptors obtained certain artistic effects. Any museum of ancient sculpture offers the opportunity of convincing oneself of this. Looking in front at the head which should be seen in profile, one notices immediately that the side of the face turned away is flattened, the ear pressed in, the inner corner of the eye too near to the nose, the external corner pressed backwards. The mouth also is, on the side which is to be turned away from the spectator, flattened, the opening shorter, the corner less marked. These irregularities are further increased by differences of height if the head is not only turned, but at the same time inclined, towards the shoulder. The two halves of the face then no longer fit, but their difference corresponds in no way with any asymmetry to be observed in Nature.

To understand the artistic motive of this irregularity, it is necessary to look at the work in the direction for which it is composed. All irregularities then disappear, the contour of the foreshortened side appears of perfect beauty, and the difficulties which the sculptor as well as the painter encounters in the design of this part of the face are overcome. This fact should be considered by restorers when replacing the head of a broken statue, and by those who have to indicate the position of ancient sculpture in a museum.

Once convinced that the nasal half of the orbit only has to be considered in its influence upon anomalies of refraction and upon strabismus, one finds the measuring remarkably simplified, for the living subject as well as for the skeleton. It is no longer necessary to measure the distance between the external borders of the orbit, that between the two cheekbones and that between the two temples. The most important point is to measure the distance between the two pupillary centres, and keeping pace with it the distance between the two nasal sides, the distance between the centres of rotation from these remaining a constant one. Even in skulls of very different sizes and shapes we find hardly any differences in the distance between the foramina optica, and the depth of these is also nearly constant when measured at the nasal side of the orbit, though it varies very much when measured on the temporal side. This enables us to determine the angle formed by two lines going through the centres of rotation of the eyeball and the foramen opticum for different distances of the pupils. To abbreviate we will call this angle the Angle B.

I look upon the influence which variations of this angle have upon refraction and strabismus in the following way :—

If the angle B is larger than normal a greater effort of internal recti than usual becomes necessary in order to obtain convergency of the optic axis for a given distance of work, say for reading. The consequence is a greater effort of accommodation than necessary. Convergence and accommodation moving in harmony, each eye is adapting itself for that distance for which convergence would be obtained in the case of normal B ; therefore for a shorter distance than the one for which in this case of larger angle B convergence has been obtained. In consequence, a tendency is shown to approach the fixed object more closely than neces-

sary, even if the refraction of the eyes, the acuteness of vision, and the size of the object, are sufficient to admit of a greater distance. There need be little doubt on this point, for one so frequently observes children with nearly normal refraction showing just the slightest beginning of myopia, who nevertheless approach their books or papers too closely when reading and writing, and even in some cases use the nearest point of accommodation that can be attained with a given amount of convergence. For the same reason we find on examining the refraction when they look at a distance that the farthest point of their accommodation appears nearer than in reality (latent refraction).

Insufficiency of recti interni, based upon too large an angle B, must not be considered as caused by a weakness of those muscles; they may be of quite a normal strength, and nevertheless insufficient for work that in consequence of the abnormal size of angle B surpasses the physiological exigencies. This, however, they exert only so long as they can overcome the difficulty caused by the unnecessary tension of accommodation, but if the angle B is still larger, or if myopia is highly developed, their fatigue becomes evident, and in still more pronounced cases convergence is given up for shorter distances, and at a still higher degree even divergence comes on for greater distances.

We have now to speak of the practical question of prophylaxis and treatment of myopia. How far have we from this point of view to consider the influence of the angle B?

First of all it is necessary to regulate the relation between convergence and accommodation. The physiological harmony between these two functions is lost through increase of work of the recti interni in all cases of too large an angle B. To re-establish the harmony one might either diminish the effort of convergence

by prisms or remove the distance for accommodation by means of concave glasses, or divide these two effects by combinations of prisms with concave glasses.

For children in what I would call the prodromal stage of myopia characterised by approaching the object too closely in spite of normal refraction and normal sharpness of sight, I prescribe prisms as soon as they begin reading and writing. To determine the degree of the prisms, I choose the weakest which enables the child to keep the book at the proper distance. In the same way I order the prisms without concave glasses when slight myopia is already manifest, and I confess that *I consider such a use of prisms as the only positive means of preventing the progress of myopia*. Of course I do not mean to say that any of the ordinary precautions should be neglected, such as proper lighting, posture, &c. On the contrary, in my lectures on school life in its influence on sight and figure,<sup>1</sup> published nearly thirty years ago, I completely treated all precautions to be taken, and designed some new school furniture, which was soon after officially adopted for 106,000 children by the London School Board, and thus contributed to the gradual abandonment of the old forms of tables and benches in England as well as on the Continent.

In all cases in which myopia is already developed to such a degree as to form an impediment to a right position, and to instruction in school rooms altogether, it is necessary to combine prisms with the weakest concave glasses which would be sufficient. Complete correction of myopia by concave glasses without prisms or decentration (the centres farther apart than the pupils) I consider dangerous in all cases of large angle B. With normal or smaller angle B only it may

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<sup>1</sup> J. and A. Churchill, Great Marlborough Street, London.



be permitted. Such are probably all cases reported as proving the beneficial effects of constant use of concave glasses corresponding to the degree of myopia, a system recommended now by many ophthalmic surgeons.

But even with a small angle B this system is acceptable for a certain period of life only, that is, about the age of 20 to 40 years, or when grown up till the onset of presbyopia. Before and after this period I prescribe weaker glasses for reading and complete correction for distance, and in some cases of special occupation even a third set for middle distance.

One should, however, not go in too systematically for these principles. Practically, it will be necessary to consider each case individually, as differences between the two eyes, astigmatism, incomplete sharpness of sight, strabismus divergens, &c., may very much complicate the question.

I may add in a few words my views upon the influence of a *smaller* angle B on strabismus convergens with hypermetropia. Here also there exists a difference in the effect of convergence and accommodation, both being instituted by identical nervous impulse ; but the small angle B facilitates convergence, therefore the effort of accommodation necessary to counterbalance hypermetropia is not accompanied by a convergence for the same distance, but by convergence for a shorter distance (strabismus convergens). To re-establish the harmony it is necessary to correct the hypermetropia with convex glasses.

Hypermetropia with *larger* angle B is not so frequent, and when present produces, not convergent squint, but insufficiency of the internal recti, and even divergent squint. In such cases it is not easy at once completely to correct the hypermetropia, as it is partly latent, and may even simulate myopia in consequence of the efforts at convergence and the accompanying

tension of accommodation. It is then necessary to combine the convex glasses with prisms.

Forty-one years ago I described such a case in *Graefe's Archiv* as *Scheinbare Kurzsichtigkeit bei übersichtigem Bau und Accommodationskrampf*. Since that time I have very frequently used prisms and decentered glasses in re-establishing harmony between convergence and accommodation as the only remedy in frequent cases of asthenopia. When I retired twenty-two years ago from practice in London, most of my patients received the advice to leave the prisms out; I therefore take the opportunity of insisting upon a closer study of this question.

## REVIEWS.

F. TERRIEN (Paris). Congenital Keratitis. *Archives d'Ophthalmologie*, May, 1902.

THE author gives in the first place a very careful account of a case with which he has met, in which he was able to make a very thorough pathological examination.

An infant born at term, the child of a woman who from the seventh month of pregnancy had had a very considerable amount of albumin in the urine, showed at the time of birth a central opacity of each cornea without any other malformation whatever. On the day after birth there was a diffuse infiltration in the central area of the right cornea, not affecting the periphery which to the width of 2 mm. or so all round was quite normal in aspect. The central part, however, was almost like porcelain in appearance, but was not so opaque as entirely to prevent a view of the iris and pupil; it was of a bluish-white colour, and though the epithelium was intact, was quite plainly an infiltration and not a scar. The anterior ciliary vessels were not engorged, and in all other respects the eyes were normal. The left eye was in a state exactly similar to the right, except perhaps that the area of opacity was not quite so large. The infant succumbed on the eighth

day to broncho-pneumonia, when the eyes were removed and hardened.

On section the cornea was found to be thickened throughout, but not the sclera; the latter had the appearance of splitting into two layers at the corneo-scleral junction, between which the cornea was set like a watch glass. At the central portion of the cornea was a large and deep posterior abscess; at this point the cornea showed division into two layers: an anterior, narrow portion, whose tissue was similar to the peripheral portions of the cornea, and a posterior, thicker part, reacting differently to reagents, and fading away gradually at its periphery into normal tissue. Bowman's membrane and the epithelium were quite intact, but the anterior layers of true cornea seemed to lie apart more than usual with spaces between them, and the connective fibres were swollen and cedematous. The posterior portion in the region of the ulcer resembled sclerotic rather than corneal tissue; the fibres, which took on colour much more deeply than those in the anterior part, were wavy in outline, and between them lay large lymphatic spaces. In this area the cellular elements were very profuse, and became more so the nearer the posterior surface was approached. In the zone lying intermediate between these two there were abundant blood-vessels. Over the ulcerated area Descemet's membrane was quite gone; its floor was formed of the altered corneal substance. The sclerotic also was somewhat thickened, but not to the same extent as the cornea; the iris and uveal tract generally were engorged; the iris was pushed forwards till no "angle of the anterior chamber" existed, and at certain points the iris was incorporated with the floor of the ulcer. So great indeed was the infiltration of the iris that the surface of the iris appeared quite bossy and irregular, and masses or granulomata were to be seen here and there, either free in the anterior chamber or lying in contact with, and adherent to, the endothelium of Descemet's membrane. The lens was of relatively large size, but normal in aspect; the retina, at least as far from the inner surface as the internal granular layer, exhibited an accumulation of red corpuscles, the vessels were engorged, and there were fairly numerous hæmorrhages. Though the optic nerve appeared normal the subdural sheath was quite filled with extravasated blood. The changes as a whole were somewhat less marked in the left eye than in the right, but the above description is applicable to both.

There can be little doubt that we have here a congenital keratitis—an actual inflammation with partial destruction;

indeed, the fact of this ulceration and the existence of the new formed vessels in the cornea form the chief means of which one can definitely settle that the condition is due to an inflammatory affection, and that it is not simply a defective development. As regards these blood-vessels, it should be borne in mind that both Leber and Schöbl have shown that at no period in its development does the cornea possess blood-vessels except at its very most superficial layers. And as regards the presence of the numerous cellular elements, it must be noted that while it is quite true that at a certain period of development the cornea is rich in these, that is at a much earlier stage only, and they become more and more scarce long prior to the close of pregnancy, so that there remains no element to disturb the diagnosis of keratitis of the interstitial type. Steffan, in a case of his, in which the lens (as in the present instance) lay close against the cornea, was inclined to attribute the keratitis to this circumstance; in Terrien's opinion this is an erroneous view: he considers that the dislocation of the lens is secondary, that it is due to inflammation of the uveal tract and consequent relaxation of the suspensory ligament. When making a diagnosis of interstitial keratitis, however, one must not omit to consider particularly the fact of the injection and copious infiltration of the uveal body and iris, so copious as actually to give rise to granulomata, pediculated in some instances, free in others, formed round new vessels. Terrien sees here a close analogy with what one observes in inflammations of serous membranes, for the endothelial cells hypertrophy, elongate and send out processes, which, uniting with one another, form new capillary walls. At the same time appear numerous nuclei contained in granular protoplasm, with leucocytes undergoing granular degeneration. These are veritable small endotheliomata, comparable to those seen on the surface of the iris, where indeed they partly take their origin from the endothelial covering. In Terrien's opinion the great point, the essential feature of such a condition as he has been describing, is this cellular infiltration of the entire uveal tract, causing granulomata

of the iris and distension of the veins in the choroid. In choroid, retina and nerve-sheath, there were, too, numerous hæmorrhages, and similar changes to those just described have been recorded by Hosch and Tepljaschin. In all, the corneal manifestation is in reality secondary to an invasion of the uveal tract, which is the primary and essential element. If it were not, then it would be difficult to account for the fact of the invasion of the *posterior* part of the cornea, and its ulceration, and the freedom of the anterior part and Bowman's membrane. This invasion of the cornea he believes to be brought about by the destruction of the endothelium of Descemet's membrane by the iritic changes; the aqueous then penetrates the substance of the cornea, and inflammation and ulceration of that membrane are established. In this particular case the original cause of this uveitis did not appear to be syphilis, as is sometimes the case, but the vice of nutrition indicated by a grave condition of albuminuria in the mother and by hæmorrhages into the tissues in the child.

W. G. S.

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**SCHIECK (Göttingen).** Clinical and Pathological Investigation of Toxic Amblyopia. *v. Graefe's Archiv für Ophthalmologie*, liv., 3.

Twenty years ago the first step in the elucidation of the pathology of toxic amblyopia was taken, when it was proved that in advanced cases the papillo-macular bundles of the optic nerves are structurally affected. The question of the primary lesion is still a matter of controversy. Is it a proliferation of the connective tissue septa? Is it a degeneration of the ganglion cells of the macula? Or is it an atrophy of the nerve fibres of the papillo-macular bundle, followed by proliferation of connective tissue or neuroglia cells, and possibly accompanied by degeneration of some of the ganglion cells over the whole retina. The last is the latest view of Birch-Hirschfeld,<sup>1</sup> and it is the view which most

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<sup>1</sup> See OPTHALMIC REVIEW, 1902, 283.

nearly coincides with that of Schieck, who, however, points out very truly that experiments with methyl-alcohol on animals are by no means strictly analogous to toxic amblyopia in man. Schieck's own conclusions are based on the case of a man, aged 35, who had noticed that the sight of his only seeing eye had been getting worse for seven weeks before he was admitted into hospital, and who, two weeks afterwards, died from the effects of a fall out of window during an attack of delirium tremens. Ophthalmoscopically there was no pallor on the temporal side of the disc, only a slight haze of the disc margins, and it was known that five years previously the eye had been normal. The main points established by the pathological examination were:—

(1) Marked changes in the papillo-macular bundles of both nerves were present.

(2) The intensity of the changes was not equal on the two sides.

(3) No shrinking or alteration in form of either nerve, as a whole, was noticeable.

(4) The most striking change was a great increase of connective tissue. This connective tissue consisted of a meshwork of newly-formed vessels with thickened walls. Many of the vessels were sclerosed to such an extent that the lumen was obliterated.

(5) Whereas in a normal nerve the septa can be distinguished into primary and secondary, according to their thickness, in the diseased area no such distinction could be made. Careful examination at the borders of the diseased and healthy areas showed that this was due rather to the hyperplasia of secondary septa than to the contraction and increase of thickness in the primary.

(6) There was a great increase in the number of nuclei, principally of connective tissue cells—also of endothelial cells. No great increase in the number of glia cells, such as is described by Birch-Hirschfeld, was discovered.

(7) With regard to the nerve-fibres, although in the affected track many fibres had degenerated, there were many left intact in each fasciculus. There was no appear-

ance of their having been compressed, and in some places there were holes and clefts.

(8) Nothing abnormal was found in the retina, but since the tissue was not recent enough to make Nissl preparations, any fine changes may have escaped observation.

The interpretation put by the author upon these appearances is that the new formed-connective tissue fibrils, far from causing atrophy of the nerve tissue by compression, merely fill up spaces formed by an antecedent atrophy of the nerve substance. Going a step further back, he finds the cause both of nerve atrophy and of connective tissue proliferation in the disease of the vessel walls caused by alcohol.

In this way toxic amblyopia is brought into line with multiple neuritis caused by alcohol, in which disease, according to Gudden, the beginning of the degenerative process can be traced back to the vessels. The papillo-macular bundle, says Schieck, being for a great part of its course furthest removed from the lymph-stream, suffers most easily from the defective blood supply, while the newly-formed connective tissue is nothing but the tissue carrying the collateral circulation. In cases which recover, this collateral circulation is sufficient to restore function. In other cases it is itself attacked by the disease which it fails to remedy.

To ascribe ordinary toxic amblyopia to a process of endarteritis obliterans, is a new and somewhat startling theory. It is hard to see how it could be applied to those cases in which not alcohol but tobacco is the chief poison. Moreover one can scarcely imagine that in the cases that we have to deal with clinically where recovery is the rule, structural changes can have taken place anything like those described in this paper as the result of disease which had only lasted nine weeks. This suspicion arises, that the disease was in reality much older than nine weeks, even though the temporal side of the disc was not pale. However this may be, this work cannot be left out of account by future investigators in this field.

A. HUGH THOMPSON.

ANDERSON (Cambridge). Effect on the Pupil of Excision of the Ciliary Ganglion. (*Preliminary Note*). *Journ. of Physiology*, vol. xxviii., No. 3.

DELENS. Note on Extirpation of the Ciliary Ganglion. *Bull. de la Soc. de Chirurgie, Paris*, April 23, 1902.

ROHMER (Nancy). On Extirpation of the Ciliary Ganglion. *Annales d'Oculistique*, July, 1902.

After extirpation of the superior cervical ganglion in animals, slight stimulation often produces a paradoxical pupillary dilatation. This has been attributed to increased tone in denervated unstriated muscle. Anderson has attacked the problem by extirpation of the ciliary ganglia in a series of kittens. In these cases he was able to obtain paradoxical pupillo-constriction of the denervated sphincter, a much less equivocal result than that previously described. He shows conclusively that this is not due to increased tone but to increased excitability, brought about by very slight stimuli, such as picking up the animal, &c. These results are of interest in the consideration of the paradoxical results sometimes observed clinically.

Rohmer has extirpated the ciliary ganglion in seven cases of absolute glaucoma. His pupil, Mlle. Kaminska, determined the exact situation of the ganglion by careful measurements in six bodies. It varies considerably. Her mean measurements are as follows:—

|  |          |
|--|----------|
| From the supero-external angle of the orbit .. | 39.3 mm. |
| „ „ supero-internal „ „ ...                    | 38.8 „   |
| „ „ posterior pole of the eyeball ...          | 15.5 „   |
| „ „ optic foramen ...                          | 9.5 „    |
| „ „ middle of the superior orbital margin ...  | 42.6 „   |
| „ „ middle of the inferior orbital margin ...  | 44.9 „   |

The method used was in most cases a modification of Krönlein's operation. It was not always possible to demonstrate the presence of the ganglion in the tissue removed. The hæmorrhage was considerable in three cases. In all cases the pain was ultimately alleviated, but in no case was the tension reduced to normal. In all cases



there was considerable limitation of movement following the operation.

Delens' paper discusses the various operative methods for extirpation of the ciliary ganglion. Krönlein's operation is apparently the most successful.

It will be seen that the results afford little support to the view that the increased intra-ocular tension is due to the ciliary ganglion. There is even less experimental evidence for this hypothesis than for that which attributes this function to the superior cervical ganglion. The amelioration of symptoms is readily explicable upon other grounds; the indications for this operation have yet to be demonstrated.

J. HERBERT PARSONS.

ASAYAMA (Kioto). Microscopical Investigation of a Case of Sympathetic Ophthalmia. *Graefe's Archiv für Ophthalmologie*, liv., 3, 1902.

That the pathogenesis of sympathetic ophthalmia remains a highly obscure subject is hardly surprising in view of the small number of pathological examinations that have as yet been made. To test Deutschmann's theory that the disease spreads down one optic nerve, across the chiasma and up the other nerve to the second eye, it is of course necessary that all these parts should be obtained *post mortem* for examination. As yet this has only been done in three cases, the third being, in fact, the one on which the present paper is written. It is therefore of considerable importance.

The first of these cases was Deutschmann's own.<sup>1</sup> He found changes along the course of both nerves and chiasma, mainly in the pial sheaths and septa, as well as along the whole uveal tracts in each eye, and these appearances being in complete accord with the results of his own well-known experiments on rabbits, seemed to bid fair to settle the question. Subsequent investigators, however, failed to

<sup>1</sup> For a full description, v. Norris and Oliver's Text book, vol. iii., pp. 764-7.

confirm Deutschmann's experiments, which by themselves can have but small weight, especially as rabbits have never been known to suffer from sympathetic ophthalmia as the result of an injury. Neither have Deutschmann's conclusions received much support from the clinical side. In the second case of complete examination, recorded by Grünert,<sup>1</sup> while in the exciting eye the whole uveal tract was inflamed, in the sympathising one there was merely iridocyclitis, the choroid being free. In the nerves there was inflammation extending some way, but not all the way, back from the discs, and more in the exciting than the sympathising eye. The intracranial parts of the nerves were free, but the chiasma itself was affected.

In Asayama's case the description is even more at variance with Deutschmann's. The chiasma showed no demonstrable abnormality and the nerve of the sympathising eye was only affected in the neighbourhood of the disc. On the other hand, the whole uveal tract of the second eye was very markedly inflamed, and the choroid enormously thickened, while the supra-choroidal space in the posterior part of the eyeball was completely obliterated by a copious new formation of spindle-celled connective tissue.

The history of the case is briefly this. The patient was a labourer, aged 27 at the time of his death. Between the ages of 14 and 16 the right eye had become blind, in consequence of a blow from a stone. At the age of 25 the blind eye was affected with a serpiginous ulcer of the cornea, which yielded to treatment in a week, but became painful again four months later, when it was found that the left eye was also inflamed and suffering from "keratitis punctata." The blind eye was excised, but the disease in the other eye gradually advanced to blindness. Eighteen months after the excision the patient was admitted into the general wards of the hospital and died, the *post-mortem* diagnosis being tubercular disease of the lungs, with pyopneumothorax and parenchymatous nephritis.

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<sup>1</sup> *Monatsblätter für Augenheilkunde, Beilageheft*, 1900.

The question naturally at once arises: was not this a case of tubercular disease of the second eye, and not one of sympathetic at all? The author meets this objection by stating that no indication of tubercle whatever was found in the eye. There were no giant or epithelioid cells, no caseation and no bacilli. The theory of Peters, therefore, that sympathetic disease is often nothing else but tubercular, finds no support here.

With regard to the bacteriological examination which in Deutschmann's case was positive, and in Grünert's negative, no conclusion can be drawn from the negative result in the present case (except with regard to tubercle) since the organisms would have had plenty of time to disappear in the eighteen months which had elapsed since the excision of the exciting eye.

A. HUGH THOMPSON.

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STEPHENSON. *Ophthalmic Nursing.* London: Scientific Press, Ltd.

Mr. Stephenson's little book has now reached its second edition. It is not a work for which there can be any large demand, but any nurse who is about to take up a post in an ophthalmic hospital, or in the eye department of a general hospital, might do well to have it at hand for reference in regard to the care of bottles of "drops," shades, care of patients after operations, &c. But when all is said and done, the nursing of "eye" patients is very much like the nursing of any other kind of patients, and is to be conducted along the same lines.

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DE WECKER (Paris). *The Cure of Detachment of the Retina by Subconjunctival and Intracapsular Injections of Salt Solution.* *Annales d'Oculistique*, August, 1902.

It does not seem that the profession as a whole has had sufficiently encouraging experience of the value of injections in cases of detachment of retina to place much reliance in this method of treatment. de Wecker, who is

an advocate of such injections, returns to the subject in an article of some length, in which he deals in the first place with the question of the most suitable fluid to introduce. He states that the more concentrated solutions undoubtedly give the best results, and further that the injections must be given repeatedly if a cure is to be effected in this way. Unfortunately, the pain caused by ordinary salt solution is greater with the more concentrated solutions; so much is this the case, that patients will not submit to repeated injections without an anæsthetic if the strength of the solution used be greater than 10 per cent. With a view to overcoming this difficulty, de Wecker has tried the effect of sodium sulphate solution with gelatine, but without any success; for though pain can be in this way avoided the necessary concentration cannot be obtained.

Solutions of salt prepared with fluid taken from the vitreous of the ox are stated by him to give very satisfactory results, but he gives no definite data by means of which an unprejudiced opinion could be formed. This preparation has been termed "chloro-vitreine," and can be used with 30 per cent. of sodium chloride without causing serious pain; in some cases, indeed, without any. In equal degrees of concentration this solution of salt in vitreous fluid would appear to be much superior to ordinary watery solutions. In a footnote de Wecker gives an account of the precise way in which this substance is obtained and prepared.

In relation to the mode of action of the injection and the best site for its introduction, the writer also discusses the extent and relations of the capsule of Tenon, and in this connection quotes the opinion of M. Motais, who places the anterior limit of the capsule at the level of the insertions of the tendons of the straight muscles, and holds that channels of communication pass from the anterior part of the capsule to the subconjunctival spaces in front.

Though it is admitted that fluid can be injected into the capsule of Tenon, de Wecker believes that it readily escapes—by the above-mentioned channels—to the subconjunctival spaces. The appearance of subconjunctival

swellings towards the end of an injection and in the region of the tendons of insertion of the straight muscles is regarded by him as satisfactory evidence that he has successfully introduced the fluid into Tenon's capsule, from which it has escaped forwards under the conjunctiva. Should such swellings in any case be absent, he infers that the fluid has not been properly lodged in the capsule, but has passed into the orbital tissue behind the globe.

After referring at some length to the well-known theory of diffusion by which Raehlmann has explained the occurrence of retinal detachment, de Wecker concludes by saying that he thinks results justify the continued use of salt solution injections as a therapeutic agent in detachment of retina.

A. H. H. SINCLAIR.

## OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

CLINICAL EVENING, THURSDAY, DECEMBER 11, 1902.

Mr. LANG, *Vice-President*, in the Chair.

A resolution of condolence on the death of the President, Mr. David Little, was unanimously carried.

### CASES.

*Contracted Pupils undilatable with a Mydriatic.*—Mr. Stephen Mayou. The patient, a girl aged 5, was brought for advice as she appeared to have defective vision, and when awakened in the morning was in the habit of covering both eyes for a short time to avoid the light. On examination, slight lateral nystagmus was found, and the pupils were both contracted to pin-point size but reacted normally; it was found to be impossible to dilate them with a mydriatic. A very slight dilatation resulted from the continual use of atropine (gr. 4—5i.) three times a day for a week, followed by the application of a crystal of sulphate of atropia together with adrenalin and cocaine. Both irides showed a curious concentric marking which was also present, but to a slighter extent, in all the other (six) children of the same family. There were no signs of posterior synechiæ, or of a pupillary membrane, and the tension of both globes was normal. The fundus also normal.

In the discussion which followed the reading of this case, Mr. Sydney Stephenson thought the patient was a fairly typical example of hereditary syphilis, and pointed out the absence of knee-jerks, the slight response in reaction of the pupils to light, and their ready reaction to accommodation ; these symptoms suggested that the case might be one of early locomotor ataxia or general paralysis.

The Chairman said there were many pure cases in which there was no evidence of any syphilitic taint, and where the pupils did not dilate ; he stated that out of 100 cases of congenital syphilis with interstitial keratitis which had been examined, the knee-jerks were absent in 68 but the pupils reacted well in all of them, so the absence of the knee-jerks would not be exceptional in this case.

Mr. Devereux Marshall asked whether in cases such as those mentioned by the Chairman the knee-jerks ever came back later in life, as he believed neurologists looked upon the absence of the knee-jerk as a definite pathological occurrence which only happened with serious lesions of the nervous system.

*Demonstration of (a) Classification Test for Colour Blindness : (b) a Lantern Test for Colour blindness.* Dr. F. W. Edridge-Green gave a demonstration of the above tests, which are described in full detail in his book on "Colour Blindness and Colour Perception," International Scientific Series (Kegan Paul and Co.).

The Chairman said the meeting was much indebted to Dr. Edridge Green for the demonstrations, which would be of great value, since hitherto Holmgren's test had always been adopted, but it now seemed inefficient. He said in all probability the Council would appoint a committee of investigation into the subject.

Mr. Adams Frost asked what was the routine method of testing adopted by Dr. Edridge-Green ? Did he begin by testing with coloured wools, glass, and cards, or did he use the lantern test first ? He said he understood that a man might pass Holmgren's test and yet fail with Dr. Green's lantern test, also that he might pass with Dr. Green's wool and glass test, and yet fail in the lantern test, and therefore might be an unsafe person to employ as a signalman, confusing a red for a green light. He urged Dr. Green to bring forward a number of such persons to be examined by a small Committee of the Society, since for years past the Society and the profession generally had been impressing upon the Board of Trade and Railway Examining Boards the necessity

of using Holmgren's test, and now it was found that that test might not be sufficient for signalmen.

Dr. Breuer thought Dr. Green's test by itself did not justify any man being condemned as colour blind, since it did not distinguish between colour blindness and colour weakness. He also thought that any person who was able to pass Holmgren's test was not colour blind. He believed Dr. Green's test was admirable, but considered it was unreliable alone ; it must be taken in conjunction with Holmgren's test.

In reply, Dr. Edridge-Green stated in answer to Dr. Breuer that his test was absolutely reliable, and wherever it had been tried it had always succeeded in detecting anyone colour blind ; at the Royal Society's examination his test was the only one which detected every case of colour blindness ; several cases had been passed by Holmgren's test with one examiner and yet had been rejected by another. He pointed out that there were six varieties which might escape detection by Holmgren's test. In conclusion, he stated that his test was absolutely practical and had no relation to theory at all ; also that shortening of the red end of the spectrum was of most importance, shortening of the violet end was not of much importance.

*Two Cases of Aniridia and one of Coloboma of the Iris in the same Family.*—Mr. Charles Blair and Dr. Bernard Potter. One patient, a girl aged 14, showed absence of the iris complete in both eyes except for a narrow margin on the inner side. The choroid was also defective below and internal to the disc, where a circular whitish area about half the size of the disc was apparent, and other similar but smaller patches were also to be seen in this neighbourhood in the right eye. In the left eye no change was visible in the fundus. In neither eye was there any opacity or notching of the lens, or any increased tension. Vision with suitable concave glasses was R.  $\frac{6}{12}$  ; L.  $\frac{6}{12}$  and J. 1.

The second patient, brother of the last, a boy aged 11, showed in the right eye an entire absence of the iris, deficiency of the lens at its lower edge and anterior pyramidal cataract ; in the left eye, also, absence of the iris except at the upper and inner parts where a slight margin of iris was present, and anterior pyramidal cataract. Both corneæ were clear, and there was no history of any inflammatory affection either in infancy or later. No ciliary processes could be seen, each disc showed marked cupping but not of the whole papillary area, the tension of both was normal. Vision with suitable correcting glasses for myopia R.  $\frac{6}{60}$  and J. 4 ; L.  $\frac{6}{18}$  and J. 2.

The father of these two patients, aged 37, showed in the left eye a large coloboma of the iris down and in, with slight notching of the edge of the lens and fine dotted opacities at the anterior surface of the lens. In the right eye also there was a peculiar discoloration at that portion of the iris corresponding to the coloboma in the left eye, which was inactive and unaffected by a mydriatic, while the rest of the pupil dilated freely.

Mr. Blair said he would like to hear what proportion of similar cases became glaucomatous, and what was the best means of preventing such a result. He thought the opinion had been expressed before the Society on one occasion that all such cases, sooner or later, became glaucomatous.

*Zonular or Ribbon-shaped Opacity of the Cornea.*—Mr. Charles Blair. The patient, a man aged 72, had on each cornea a transverse band of opacity composed of whitish superficially situated dots, having a chalky appearance and lying immediately beneath the epithelium, which latter was intact over it and over the rest of the cornea, and was in no way roughened over the deposit. On both corneæ the opacity extended from the outer side towards the centre, in the right eye rather more extensively than in the left, but in both eyes a commencing opacity on the inner side of the cornea was evident. Very little change in either extent or density of the opacities had taken place during the two years the patient had been under observation. The patient was a house decorator by trade, and had always been in the habit of blowing away the dust before painting.

(a) *Eye Heaters.* (b) *A New Regulating Transformer.* (c) *A Lamp Resistance.*—Mr. Ernest Maddox.

(a) *Eye Heaters.*—This very neat apparatus for applying dry heat to the eyeball, utilising the electric current in a perfectly safe and adaptable manner, was devised by Mr. Maddox for use in a case of urgent necessity, and in his opinion more than supplants the method of applying dry heat by means of either hot water tubes or the Japanese muff warmer, which up till now he had used for that purpose. The heater consists of two layers of flannel enclosing between them a continuous wire, either of tinned flower wire or better still, silk-covered platinoid wire; this is stitched on to one side of one piece of flannel in a concentric manner and covered up by stitching the other piece of flannel over it. The heater in size is small enough to cover the globe through the lids, but does not overlap either upon forehead or face. Its weight is insignificant and inappreciable by the patient. Both ends of the wire are connected to the source of electric current, forming part



of the circuit. The amount of current passing through the wire, and thus the amount of heat given out, can be regulated by interposing more or less resistance, and thus the exact amount of heat which affords the greatest comfort to the patient and at the same time does the most good to the eye, can be obtained. The heater may be kept on the eyeball continuously night and day, but Mr. Maddox has found the most beneficial method is to leave it on for some three hours at a time with equal intervals between the applications. A small circle of lint is first placed over the eye, with the lids closed of course, and then the heater, the insulated wire being fixed to the cheek or forehead by means of a piece of strapping to prevent dragging the eye, then a pad of cotton wool, the whole being kept in position by means of a light roller bandage round the head. Rheumatic affections of the eye, whether of the iris, ciliary body or sclera, are those in which most relief is given, the pain often disappearing in a minute or so. Next in order come gouty affections, also glaucomatous iritis. Many neuralgic and glaucomatous conditions receive benefit from the effect of dry heat.

(b) *A new Regulating Transformer*.—This instrument consists of the usual primary and secondary coil, as in Woakes' transformer, and the du Bois-Reymond coil or induction apparatus, but by means of an internal screw the secondary coil is moved gradually and slowly over the primary to increase or decrease the intensity of the induced secondary current. For making use of the ordinary street current for ophthalmic work this coil has two great advantages, first, that no metallic connection can be even momentarily established between the patient and the main street-current; secondly, that the transformer converts a small current of high electromotive force (as in the street mains) into a larger current of low electromotive force, thus reducing the voltage of the current flowing along the cords to the patient to one of perfect safety. Mr. Maddox's transformer is provided with a plug at one end which enables it to be fitted into any electric incandescent lamp holder where it hangs up, well out of the way, while the cord conveying the secondary induced current to the patient, which is thin and very light, may be led to any required spot. This transformer may be used for either eye-heating or for the ophthalmic electric cautery. With one of the eye heaters attached to the transformer the patient can himself safely and readily regulate the heat applied to the eye. The above instrument is only for use when the street current is of the alternating variety.

(c) *A Lamp Resistance*.—This is for use when the street current

is of the continuous variety. This apparatus consists of a circular brass band in which five lamp holders and a pair of binding screws are fixed. Four of these lamp holders are in parallel, so, knowing the amount of main-current and knowing the current required by each lamp, the amount of current required for eye heating or for the cautery can be calculated. The alternative lamp holder, or the pair of binding screws, to which are attached wires, convey the reduced current after passing through the one, two, three, or four resistance lamps as required, to the patient; in order still further to regulate the amount of current conveyed to the patient, a shunt or small resistance may be attached to the binding screws and the current passed through it, thus enabling one to increase or decrease the resultant current before applying it to the patient. This apparatus also affords a very ready means of administering either continuous currents without the use of the galvanic battery, or with the alternating current, sinusoidal currents to be used instead of Faradism either for the ocular muscles or for resuscitation of the heart under anæsthesia.

The Chairman thought the eye-heater would be very valuable. He had used an instrument much more cumbersome for the same purpose, but thought Mr. Maddox's instrument much more portable and serviceable.

*Cases Illustrating an Unusual Form of Corneal Opacity, apparently due to the long-continued Application of Copper Sulphate to the Palpebral Conjunctiva.*—Mr. Sydney Stephenson. The opacity in these cases appeared as a reddish-brown or rusty-coloured arc lying in the cornea near the upper or lower part of the limbus and occupying much the same position as a commencing arcus senilis. Mr. Stephenson had observed these opacities exclusively in children who were or had been under treatment for trachoma. For the following reasons he came to the conclusion that this opacity was due to the long-continued application of sulphate of copper to the palpebral conjunctiva: (1) The change was found only in eyes the conjunctiva of which had been treated by bluestone; (2) the longer the treatment had been, the more pronounced was the opacity; and (3) scrapings from the affected cornea gave the characteristic chemical reactions of copper. He stated that the opacity usually takes the form of a faint, diffuse, smoky dulness covering in an advanced stage the whole of the cornea excepting a narrow peripheral ring not greater than 1 mm. in width. The upper and lower part of these discs are the more marked, so that two conspicuous crescents, often of a greenish or rusty colour, are formed; the upper of these is usually the better

seen. The opacities are best made out by focal illumination, and appear to be superficial in position; they interfere but little with sight. Mr. Stephenson stated that the eyes of 147 children of both sexes, whose ages varied between 4 and 16 years, had been examined with dilated pupils by focal illumination; all these eyes had been treated with copper sulphate a varying number of times, from as few as 3 to as many as over 2,000. The cornea was found to be normal (as regards this particular opacity) in 57 cases out of this number, and affected in 90 cases. Amongst the affected, the corneal changes were slight in 55 and copper had on an average been applied 844 times; in 16 cases the corneal affection was moderate, and copper had been applied on an average 977 times; and in 19 cases the cornea was markedly affected and in these copper had been applied on an average, 1,178 times. Amongst the unaffected, copper had been applied on an average 379 times. The intensity of the opacity appeared to be directly proportional to the number of applications of the copper sulphate.

The Chairman said he thought the cornea was capable of taking up a good many stains, and supposed Mr. Stephenson's cases showed that it was capable of taking up sulphate of copper crystals. He himself had noticed many years ago that after using quinine solution for a corneal ulcer a fluorescent appearance throughout the cornea became evident, which he attributed to absorption of quinine crystals by the circulation.

Mr. Stephenson suggested that the material deposited might probably be cuprous oxide, or possibly an albuminate of copper. He exhibited paintings of the corneal condition in a slight, a moderate, and a marked case.

*Congenital Anophthalmos.*—Mr. N. C. Ridley. The patient, a child, 1 year and 8 months old, showed normally-formed lids, but only tiny, constantly moving, rudimentary stumps in both orbits. When first seen about a month ago, though the lids were normal, no sign of even a rudimentary eye was present in either orbit. The father's eyes were normal, the mother had partial coloboma of the iris in the right eye with opacities in the lens; in the left, large posterior polar cataract with an excentric pupil and deficiency of the iris upwards and outwards.

*Embolism of the Central Artery of the Retina in a Young Girl.*—Mr. N. C. Ridley. The patient, a girl aged 17, was frightened some six weeks before by a girl friend fainting in the street, immediately after which she discovered that she could not see with the left eye. Patient had previously had rheumatic fever and chorea, also psoriasis. On examination the lower part of the

retina was seen covered with exudation, the vessels contracted, the disc pale, and the macula presented the appearance of old choroido-retinitis with atrophy. When first examined, directly after the accident, the whole of the retina was occupied by exudation, and the macula itself dark red with a feathery extension extending inwards, probably due to a hæmorrhage. Vision in this eye, which was only perception of light over a small area to the outer side when first examined, had improved to counting fingers at one foot on the outer side. Mitral regurgitation was found to be present, a fact which probably pointed to a displaced vegetation from the mitral valve forming the embolus.

*Atrophy of the Optic Nerves caused by Lightning.*—Mr. Treacher Collins. The patient, a man aged 49, was knocked down by lightning in South Africa two years ago; he did not lose consciousness and did not think he was actually struck, but felt dazed afterwards and vomited. He, however, did not notice any defect of sight till the following morning, when everything appeared to be “in a mist”; this gradually got worse until now his vision is only equal to counting fingers at two feet with each eye, he cannot distinguish red or green, the right field cannot be taken, and that of the left eye is contracted down to within the 30° circle. For some months after the injury he suffered from frontal headache, which has now disappeared. He has been in the habit of smoking an ounce of shag tobacco a week and also chewed, but for the last month has neither smoked nor chewed. He denies having had syphilis. There is a constant spasmodic blinking of the lids of both eyes, the corneæ and other media are clear, and the pupils react to light and accommodation. Examination of the fundus showed the outer half of each optic disc white and atrophied, but the inner halves of good colour. Retinal vessels are normal in size and filled with blood, but no other fundus changes. The patient has slight facial paresis affecting the lower part of the face on the right side, and the tongue is protruded somewhat to the right side; there is also some deafness on the right side due to nerve change. The knee reflexes are exaggerated slightly; there is no weakness of arms or legs. After an examination of the recorded cases of eye injury due to lightning, Mr. Collins considers they are attributable to one or other of the following three causes: (1) Effects of the heat-rays, such as burns of lids, conjunctiva, &c.; (2) effects of the chemical ultra-violet rays—symptoms similar to those met with in cases of snow-blindness, ophthalmia electrica, &c.; (3) effects of electrolytic action or concussion—changes such as can be produced in animals

by shocks from charged Leyden jars, &c. Amongst these last, paralysis of ocular muscles, opacities of lens, retinal hæmorrhages and detachments, optic atrophy and rupture of the choroid. The only cases recorded in the *Transactions* are two published by Major M. T. Yarr in 1901 (vol. xxi., p. 139), one with retinal hæmorrhages, the other with detachment. Mr. Collins thought his case was due to electrolytic action.

The Chairman mentioned one other case he had seen of a lady who was blinded by a flash of lightning, and who had a small patch at the yellow spot, probably the remains of a small hæmorrhage in that region.

*Bitemporal Hemipia from Acromegaly.*—Mr. Arnold Lawson. The patient, a man aged 30, presented a typical example of acromegaly. In August, 1902, the condition of vision was: R. E., V. = letters of J. 16 with difficulty; L. E., V. = hand movements. No visual field could be mapped out for the left eye. Pituitary feeding commenced.

November, 1902.—R. V., letters of J. 20 with difficulty; field of vision smaller; L. V., letters of J. 14. Field easily mapped out.

December, 1902.—R. V. reduced to hand movements; L. V.  $\frac{6}{60}$ , and with glasses  $\frac{6}{36}$  badly. Field of R. very small. L. field has much increased.

Mr. Doyne said he had tried the administration of pituitary gland in two cases, but it did no good, therefore he had discontinued the treatment.

*An Unusual Form of Retino-Choroidal Change, the result of Hæmorrhage.*—Mr. Arnold Lawson. The patient, aged 9, did not know how long the eye had been defective, and had no history of injury. In the fundus of the right eye a large white plaque is seen to the outer side, over which the retinal vessels run; this white mass has a peculiar soft woolly appearance, and to its extreme outer side abundant hæmorrhages are visible. On the inner edge of the white mass many cholesterin crystals are seen. The disc appears fluffy and the vessels tortuous, surrounded by an area of œdema chiefly confined to the outer side. Below the level of the disc and to its outer side a circular, raised white patch is visible speckled with pigment. The large white patch runs along the large vessels wherever there is one entering it, extending more towards the disc along the vessels than anywhere else. No albuminuria or disease of any other organ is to be made out. The left eye is normal. Mr. Lawson believed the condition to be analogous to retinitis circinata and the white patch due to the extensive deposition of fibrin.

The Chairman said the second case of Mr. Lawson's was extremely interesting and important, since it reminded him of a case which he had watched for two months many years ago; eventually he had excised the eye and found a sarcoma running along the surface and not heaped up in the usual way, it was also accompanied by exudation and hæmorrhage.

Mr. Jessop asked whether there was any history of tubercle in this case, as he had seen a case almost exactly like it in which tubercle had been going on for the last nine months. There was great detachment and more hæmorrhages and pigmentation than in Mr. Lawson's case.

Mr. Lawson said there was no tubercle in the case as far as could be made out.

*A Case of Optic Neuritis.*—Mr. W. H. H. Jessop. The patient, a man aged 22, a carpenter by trade, stated that his sight was perfect till four days ago, when he noticed that he could not read; since then he has been unable to do his work and the sight has gradually become worse. No history of syphilis, family history good, he smokes a moderate amount. Ophthalmoscopically, in both eyes there is a curious condition of exaggerated retinal reflexes and contorted vessels above, below, and to the nasal side, which is probably congenital. In the right eye the disc is pale on temporal side, no swelling, vessels increased in number and very tortuous, especially the arteries, which have light streaks on them and contain but little blood; some of the smaller vessels are empty and have a moniliform appearance; no retinal hæmorrhages. Left eye: optic disc not so pale as the right on the temporal side, vessels much the same. Treated with mercury, strychnine, and blisters. The sight has continued to get worse. V. R.  $\frac{1}{80}$ ; L.  $\frac{5}{80}$ ; J. 20. Mr. Jessop thought the case one of Leber's disease, or allied to it. No other member of the family was similarly affected.

*Cerebral Degeneration with Changes in the Macula.*—Dr. F. E. Batten. The patient, a girl aged 7, had been quite healthy until a year before, and fairly sharp at her lessons, but a year ago she became very spiteful at school, had violent attacks of temper, and about this time it was noticed that her sight was failing and she looked out of the corner of her eyes. The child had had no vomiting, headache, or fits. All the movements of the eyeball were good, there was no ptosis, and no squint, but an occasional fine nystagmus. The pupils were equal, reacting but poorly to light and not retaining their contraction well. The media were clear. The discs, clearly defined and slightly pale but not

markedly atrophic, showed no sign of any previous neuritis. There were peppered pigmentary changes all over the retina, the result probably of old retinitis. At each macula there was a reddish-black spot, larger and more defined in the left eye than in the right, and about  $\frac{1}{3}$  disc diameter in size; the region immediately surrounding it was paler than the rest of the fundus and more atrophic looking. The retinal vessels were small but not remarkably so.

An elder sister of the patient, now in the asylum with some form of cerebral degeneration, showed similar changes at the macular region and paleness of the discs, together with smallness of the retinal vessels. The changes found in these two children's macular regions, together with the mental deterioration, suggests a resemblance to the condition of fundus described by Waren Tay in infants with progressive mental degeneration. The macular changes, however, bear but a superficial resemblance to that described by Waren Tay.

A similar condition at the macular regions is described by Rayner Batten in the Society's *Transactions*, vol. xvii., p 48, but in his cases no mental defects are reported; also in his cases a definite history of syphilis in the parents was obtained, but no evidence of congenital syphilis in the children. In the present child's case the family history shows two children to have been defective mentally, the patient and the second child, the third died of convulsions aged 2½. There was no history of syphilis in the parents, and no miscarriages.

The Chairman pointed out that in Mr. Waren Tay's cases, which occurred in Jewish children, the patients seemed all to die early.

Mr. Frost pointed out that in Mr. Waren Tay's cases the patch at the macula was perfectly circular and of large size, almost as large as the disc, and that in the present case there was an irregular dark spot not resembling those in Waren Tay's cases.

Mr. Treacher Collins stated that he had cut sections of some of Mr. Waren Tay's cases, and the condition seemed to be one of œdema of the macula, and the red spot to be like that caused by embolism of the central artery. Dr. Batten's case seemed to be one of actual pigmentation, as it was possible to see definite granules of pigment, quite different from Mr. Waren Tay's cases.

REGINALD E. BICKERTON.

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## CLINICAL NOTES.

LIGATION OF CANALICULI.—F. Buller has resorted to this operation in a case of cataract in which the other eye had been lost by corneal suppuration; and the puncta had a somewhat unhealthy appearance, although no pus could be demonstrated in the tear sac. The cataract operation done after such ligation was perfectly satisfactory. He also resorted to the operation in a case of corneal suppuration arising in connection with chronic disease of the lachrymal sac. With the ligation and appropriate treatment (touching the cornea with formalin diluted 1 to 60, and filling the conjunctival sac with 10 per cent. airol ointment) the suppuration was promptly arrested.

The operation is done by passing a ligature around each canaliculus, about 2 mm. to the inner side of each punctum, the threads being drawn tightly enough to occlude the canals without cutting through them. He has found no difficulty in re-opening the canaliculi after they have been ligated for two weeks, nor does their temporary closure lead to disturbance from increased accumulation in the tear sac.—*Montreal Medical Journal*, March, 1902.

DIONINE.—Gottschalk (Berlin), some considerable time ago, advocated the use of heat in cases of optic atrophy, as he found that, probably by quickening and facilitating the circulation and tissue change, this was productive of a definite improvement in central vision and in field of vision. These results he now finds he can obtain by the use of dionine, both as regards the immediate benefit and its permanency. He employs a drop of a 2 per cent. solution; this causes a certain amount of conjunctival injection and even chemosis, but along with this there is also quite evidently an increased activity in the circulation of the posterior part of the eye, and subjectively an improvement in vision, both as regards the central and the peripheral parts of the field.—*Wochenschrift für Therapie und Hygiene des Auges*, xlviii., 1902.



## OPERATION ON THE TENDON OF THE SUPERIOR RECTUS MUSCLE FOR PARE- SIS OF THE SUPERIOR OBLIQUE.

BY EDWARD JACKSON, M.D., Denver, Colorado.

WHEN the eye is in or near the primary position, contraction of the superior oblique tends to turn the cornea and the line of sight down and out, and to rotate the eyeball around its antero-posterior axis in such a way that the upper portion of the cornea is brought toward the nose ("intorsion" of Maddox, "minus cyclophoria" of Savage, "minus declination" of Stevens). If we analyse the above actions of the superior oblique, with reference to three axes, vertical, horizontal and antero-posterior, we find that it tends to turn the eye out and down, and to cause intorsion.

If, however, the line of sight were turned strongly inward, so as to lie parallel to a vertical plane passed through the centre of the insertion of the muscle and the pulley, the tendency of the superior oblique would be simply to turn the eye downward. On the other hand, if the line of sight were turned outward, until it were perpendicular to the plane passing through the pulley and the insertion of the tendon, the influence of the superior oblique would be simply to cause intorsion, and to turn the eye out, without any tendency to turn it down.

In turning the eye downward, the superior oblique is assisted chiefly by the inferior rectus. For turning the eye outward the co-operation of the inferior

oblique is required, and the obliques acting together assist the external rectus. The muscle having a similar influence in causing intorsion is the superior rectus.

When the superior oblique is weakened or completely paralysed, a strong effort is made to have its functions performed by the other ocular muscles—the turning down by increased contraction of the inferior rectus, the turning out by increased contraction of the externus, the intorsion by increased action of the superior rectus. To an important extent the same end is sought by inhibition of opposing actions. Lessened contraction of the superior rectus makes it easier to turn the eye down. Lessened contraction of the internus makes it easier to turn the eye out. Lessened contraction of the inferior oblique diminishes extorsion.

It will be noticed that this process of compensation requires the same muscle to act more strongly on one account, while it demands inhibition of its action for another reason. Let us consider in detail the relations of the superior rectus to this process of compensation for loss of power in the superior oblique. Upon the superior rectus falls almost wholly the function of preserving normal relations between the two retinæ by the production of intorsion, and by preventing excessive extorsion such as would be caused by the unopposed actions of the inferior rectus and the inferior oblique. This cause for increased contraction on the part of the superior rectus—this demand for increased action—is the greater, because the inferior rectus needs to contract more strongly to turn the eye downwards—(lacking the assistance of the superior oblique)—and the increased contraction of the inferior rectus increases its tendency to produce extorsion. On the other hand, the superior rectus is inhibited, to

prevent the eye from being turned up or in, the superior oblique no longer turning it down and out.

If, then, one seeks, by operation on the superior rectus, to aid this process of compensation for loss of power in the superior oblique, he must endeavour to do these things : First, to increase the power of the superior rectus to cause intorsion ; second, to diminish the power of this same muscle to cause upward rotation of the eye-ball ; third, to lessen the tendency of the superior rectus to turn the eye in, and increase its power of acting with the inferior oblique to help turn the eye out. These indications are all met by displacing the insertion of the tendon backward and outward.

The backward displacement corresponds to that which would be produced by an ordinary tenotomy, in so far as the power of the muscle to rotate the eye upward is concerned. But the ordinary tenotomy would diminish the power of the muscle in equal proportion for all purposes, and thus would defeat the effort to bring about compensation. When the insertion of the muscle is displaced outward as well as backward, the relations between the different effects produced by a given contraction of the muscle are altered, and a totally different result is secured. The outward displacement of the insertion is like an advancement of the tendon, in that it increases the power of the muscle to produce intorsion. It also increases the power of co-operating with the inferior oblique to assist in turning the eye outward ; at least, it opposes the tendency of the inferior oblique to cause extorsion, and thus enables it to come somewhat to the assistance of the externus.

*The Operation.*—The eye being thoroughly under the influence of a local anæsthetic, the conjunctiva is seized over the insertion of the super or rectus tendon, and an incision made as shown by the solid line in

fig. 1, the broken line indicating the tendon insertion (left eye). This incision begins about 8 mm. back from the cornea, over the nasal third of the tendon, and extends 3 or 4 mm. beyond the temporal margin of the tendon, its temporal end being farther back from

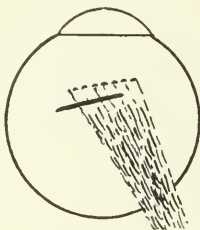


FIG. 1.

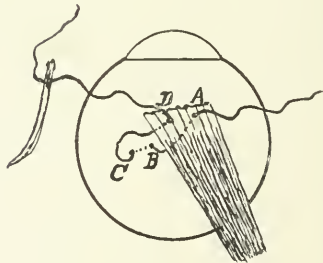


FIG. 2.

the cornea. Through this incision the tendon is raised and isolated on the strabismus hook. A small half-curved needle threaded with fine silk is then entered through the tendon (see fig. 2) at the point A.

The needle and suture are carried beneath the

tendon, emerging at its temporal margin. At the point B, previously fixed upon, the needle is made to enter the sclera, deep enough to give a firm hold but not to perforate the sclera. It is carried about 3 mm in the firm scleral tissue, and made to emerge at the point C. After this the needle is passed beneath the temporal margin of the tendon and caused to pierce it and emerge at the point D. Fig. 2 represents the suture so placed. Now the free ends of the suture and the loops A B and C D, which are left loose, are drawn out of the way. The tendon is divided close to its

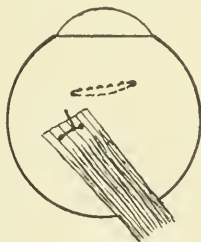


FIG. 3.

insertion and the suture is tightened and tied, bringing the central portion of the tendon A D in close contact with the sclera at B C. This gives the relation shown in fig. 3. The broken line indicates the original position of the tendon insertion.

Between A and D about the middle third of the tendon (3 or 4 mm.) should be included ; the distance from B to C should be slightly less. In dividing the suture it is well to leave one end long enough to extend through the conjunctival incision as a guide when the suture is to be removed. The placing of the suture before dividing the tendon is a little trouble-

some, but it is necessary in order to make an accurate adjustment.

To proportion the displacement of the insertion to the needs of the particular case is a matter of greatest importance. Doubtless much is to be learned from experience, but a careful study of the muscular condition present should enable one to determine approximately the displacement required. And if an approximate compensation is effected by operation, the powers of Nature, which, even unaided, can do so much to bring about compensation, can be relied upon to make good considerable operative deficiencies. All operations practised on the ocular muscles effect but approximate and often very imperfect adjustments. By careful planning, the one here described can be made as accurate as the usual tenotomy or advancement.

Assuming the radius of the eye-ball to be 12 mm., each mm. measured on its surface represents, approximately, 5 degrees of deviation or the equivalent of a 10-degree prism. Assuming that increased or diminished muscular tension is distributed equally between opposing muscles, the displacement of the insertion should be made to represent double the number of degrees of the deviation to be corrected. Thus to correct an extorsion of 5 degrees (10 centrad) the insertion of the muscle should be carried outward 2 mm. To correct an upward deviation of 10 degrees (20 centrad, a 20-degree prism) the insertion of the muscle should be carried back about 4 mm. In doing these operations I have tried to allow rather liberally for the tendency to extorsion. The general muscular tone of the individual patient should be carefully considered also.

The after-treatment required is in general the same as for one of the more modern, less severe, operations for advancement. The eye should be left free from

any bandage after twenty-four hours. The stitch should be removed in from four to ten days. Intermittent use of the eyes, and practice with prisms, if required, should begin before the end of the first week. A fixed nerve control of the ocular muscles, as nearly normal as possible, should be sought before operation. To secure this, one must resort to the correction of ametropia, wait until the muscular conditions become fairly constant, and use nerve tonics, especially strychnia, when required. The permanence and completeness of the muscular balance brought about by such an operation is indicated by the following cases.

#### CASES.

CASE I.—J. T. M., aged 45, merchant, suffered from some defect of ocular movements for which an operation, probably advancement of the external rectus, was done six years ago. But he has continued to suffer from bad headaches and at times from diplopia. There is left hyperphoria. This amounts to 4 centrads (4-degree prism) when looking upward, and increases to 30 centrads actual deviation on looking down. On looking down and to the left very marked torsion occurs. The upper ends of the two images of a vertical line are inclined together (extorsion), the angle between them being fully 10 degrees. On looking to the left there is esophoria of not more than 4 centrads. The images are most widely separated on looking down and to the right, being then displaced, one directly below the other. But they are more confusing upon looking to the left, where the image belonging to the left eye is tortd. The patient habitually carries his head far forward and inclined to the right shoulder, with face turned rather to the left, thus using the upper right part of the field of fixation. When the head is brought into the erect position diplopia becomes unendurable. He has mixed astigmatism, corrected by the following :—

Right Eye:  $-0.75$  sph.  $\ominus + 1.12$  cyl., axis 100 degrees.

Left Eye:  $-0.50$  sph.  $\ominus + 0.62$  cyl., axis 65 degrees.

These gave full vision in each eye. They were prescribed, and with the left lens was combined a prism of 4 centrads, base down. For near work he was given  $+ 0.75$  spherical added to his correcting lenses, and a prism of 6 centrads, base down, for the left eye.

With these glasses his headaches were entirely relieved, and he was able to use his eyes freely, but he still carried the head forward and to the right, and the attempt to hold it erect caused vertigo, headache and diplopia. At the end of two months the muscular conditions remained practically unchanged.

November 14, 1899, I did the operation above described upon the left superior rectus. The insertion of the tendon was allowed to fall back between 3 and 4 mm., and the stitch placed 2 mm. to the temporal side of the previous temporal margin of the tendon. The immediate effect of the operation was to cause marked diminution of the hyperphoria in the lower part of the field of vision, without any diplopia appearing in the upper part of the field.

The stitch was removed at the end of six days. By this time the effect of the operation had decidedly increased. On fixing the eyes about 10 degrees above the horizontal plane there was orthophoria. There was still a perceptible inclination of the false image on looking to the extreme left, but not more than 2 degrees.

At the end of seventeen days, with the eyes in the primary position, the prism of his distance glasses fully corrected his heterophoria. The images of a vertical line remained perfectly parallel in all parts of the field of fixation. The patient held his head fully erect, and was perfectly comfortable.

Two months after the operation the vertical prism was reduced to 2 centrads. At the end of two and a half years a vertical prism of 1 centrad corrects the heterophoria. The images of a vertical line are parallel in all parts of the field. The patient has remained free from headache, the carriage of the head is normal, and the eyes are used freely for all purposes, without discomfort.



CASE 2.—Sister M—, aged 41, a Sister of Mercy, about five years ago had a bad fall, being tilted out of the back of a waggon, and striking on the back of her head. This occurred in Arizona, where she was exposed to the excessive heat of summer. At about this time she suffered what she calls "an attack of grippe." Since then she has been subject to very severe headaches, occurring as often as once a week, worse on the right side of the head, and attended by numbness of the left shoulder, side, and arm. She has vertigo, confusion, and disturbance of vision, but does not complain of diplopia.

There is left hyperphoria, 2 centrads, on looking up, 15 centrads in the primary position, and increasing to 30 centrads deviation on looking downward and to the right. In the primary position she has 2 centrads of esophoria, increasing on looking to the left. The optic discs were opaque, slightly hazy and protruding (congenital peculiarity), but the retinal vessels were normal. She was given correcting lenses:—

Right : + 1.50 sph.  $\odot$  + 0.75 cyl., axis 65 degrees.

Left : + 1.50 sph.  $\odot$  + 1.75 cyl., axis 115 degrees.

These gave  $V. = \frac{4}{5}$  partly, and improved her vision for near work, but at the end of ten days had not affected her headaches. The impairment of ocular movements remained the same; the inclination of the false image showed extorsion on looking to the left of from 5 to 8 degrees. October 10, 1900, the operation above described was done on the left superior rectus. The stitch placed in the tendon 2 mm. behind its insertion was carried 3 mm. to the temporal side of the tendon and 3 mm. back. The stitch when tied was fully 12 mm. back from the corneal margin.

Twenty minutes after the operation the vertical muscular balance was perfect in the primary position. There was right hyperphoria on looking up, left hyperphoria on looking down. On the fourth day there was slight swelling of the lids, but no other evidence of reaction, and the headache was better. The stitch was removed. On the sixth day the right hyperphoria at the upper margin

of the field was 8 centrads, the left hyperphoria at the lower margin, 10 centrads. The two images of a line were parallel.

After this the tendency to deviate at the margins of the field grew less. At the end of fifteen days diplopia could not be produced at any part of the field by a dark blue glass without a prism; and when diplopia was produced the images of a line remained strictly parallel. She had suffered no pain since the removal of the stitch, no headache, no numbness of the arm, shoulder, and side. The lateral balance was perfect, but there remained a slight variable hyperphoria at the upper and lower margins of the field. The patient at this time left Denver, and has been out of reach of any skilled observer ever since, but after two years the relief from symptoms continues complete

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## REMARKS UPON CERTAIN DISEASED CONDITIONS OF THE CORNEA.

BY G. HERBERT BURNHAM, M.D.Tor. F.R.C.S.Edin.

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IN a very large and recent work upon diseases of the eye, with respect to the present treatment of conical cornea, the author quotes, with his full approval, the following statement made by Soelberg Wells, in his book upon the "Diseases of the Eye," dated 1873, that is, twenty-nine years ago :—

"All the methods of treatment of conical cornea are still upon their trial, and nothing decisive can as yet be said as to their relative advantages or disadvantages." In this work it is also stated that from some unknown cause the centre of the cornea of a young person may grow thin and be pushed forwards,

The diseased process, in my opinion, seems to be due to a certain impaired condition of the nervous system. My treatment is altogether different and has never previously been tried.

I shall, by way of illustration, mention one case of conical cornea; a woman, aged 30. The conicity of each cornea was most marked and long existent. The vision, in November, 1900, was  $\frac{9}{200}$ . The woman had been seen repeatedly by oculists, but never given any treatment save the use of glasses and the recommendation of an operation, which latter had not been performed. I now began my treatment. In some cases of disease of the eye I use pilocarpine hypodermically by itself, and sometimes combined with the iodide of potash and mercury given internally. This latter, I am convinced, is the more powerful, but sometimes the former is sufficient. Its mode of administration is the same as I have mentioned in my various articles already given to the profession in the *Archives of Ophthalmology*, the *OPHTHALMIC REVIEW*, and *The Lancet*. The results were as follows: In four months from the beginning of the treatment the vision was  $\frac{17}{200}$ . Again, four months later, that is, eight months from the beginning, the vision was  $\frac{20}{200}$ . About four months later the vision was worse. Two causes were at work: first, no treatment had been given, as she did not come; and also she had severely tried the eyes by very much travelling and sight-seeing. However, she again began treatment in a regular way, and now, though having gone through an attack of influenza in January, the vision is  $\frac{20}{100}$ , a decided and marked improvement. Her health, which at the beginning was poor, is now excellent, and her powers of endurance very greatly increased.

If in a long-established and severe form of the disease such good results can be produced, I maintain that if it be used in this disease in the beginning the

process can be stopped and an improvement brought about, and if the treatment be persevered in, a good useful eye. Whereas, at present, in the beginning of the disease the treatment is purely optical and no attempt is made to stop its progress; and later on, when the eye is much worse, an operation, which is followed by a success not uniform or satisfactory.

My mode of treatment is purely constitutional, and I hold that the results are encouraging and in some ways very satisfactory.

Cases of corneal nebulæ, specific and non-specific, have under this combined treatment exhibited decided benefit, that is, a marked improvement as to vision and the general condition of the eye.

This assertion I do now venture to make after twelve years' experience of the use of this treatment, that in certain diseases of the eye where, in spite of the thorough application of the authorised methods of treatment, very poor results have been obtained or only a steady progress from bad to worse, in these same diseases, under the combined treatment, results far superior have been secured, sometimes brilliant, and withal permanent. This treatment stimulates the nerve centres to a remarkable degree, and through them the ordinary physiological processes of the affected part are aroused to an activity far in excess of the normal, and thus the diseased condition is acted upon and removed. This has been my working hypothesis.

If these remarks regarding the favourable effects of this treatment apply to all parts of the eye, as I affirm they do, having proved it, they must of a surety apply to certain diseased conditions of other tissues and organs of the body.

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## REVIEWS.

MARTIN JANSSON. The Siderophone. *Mitteilungen aus der Augenlinik des Carolinischen Medico-Chirurgischen Instituts zu Stockholm, iv., 1902.*

This apparatus is intended for the detection of iron fragments that have entered the body, and especially the eye. In the winter of 1900 the author had occasion to use for this purpose the sideroscope of Asmus. The extreme sensitiveness of this instrument was found to be of great value, but there is one practical drawback connected with it, viz., that the instrument has to remain fixed on its stand, and the patient has to be moved towards or away from it during the examination. It is often undesirable, or even impossible, to remove the patient from the bed, and in such cases a portable instrument is required. This led the author to the construction of his apparatus. The principle underlying the siderophone is the well-known fact that the approach of a magnet towards a piece of iron causes a change in the lines of magnetic force. If an induction coil is placed at the pole of the magnet a current will be induced in it and can be recognised by a sensitive galvanometer. For this purpose the cheapest and most convenient galvanometer was found to be Bell's telephone. When the magnet is brought near a piece of iron in any direction except "end on," a current is produced which causes a sound in the receiver of the telephone.

The sensitiveness of the apparatus, as actually used, has been found to be as follows: A piece of iron weighing 1 milligramme was clearly recognised by it at a distance of 3 to 4 millimetres, a piece of 1 centigramme at 15 to 18 millimetres, a piece of 1 decigramme at 20 to 25 millimetres, a piece of 1 gramme at 30 to 40 millimetres.

The apparatus has been used in nine cases where pieces of iron had struck and entered the eye. It is noteworthy that in those cases where the extraction by the electro-magnet was successful the ordinary small electro-magnet (Hirschberg's pattern) was quite sufficient, and where the

Hirschberg's magnet did not succeed the giant magnet of Haab proved completely useless.

It is possible that the instrument can be made more sensitive still, when it will become more valuable; at present its great advantage is that it can be produced at very small cost, by utilising any existing telephone and any ordinary interrupter.

K. G.

ARMAIGNAC (Bordeaux). A Case of Congenital Purulent Ophthalmia. *Annales d'Oculistique*, October, 1902.

Congenital purulent ophthalmia is a rare disease, and the great majority of the cases which have been chronicled are not conclusive, owing in many cases to the insufficient data recorded, and in others to the length of time which has elapsed between the rupture of the bag of waters and the birth of the child admitting of the possibility that the infection might have been carried from the vagina of the mother by the finger of the accoucheur or otherwise. Armaignac, in a careful search through the literature of the subject, has only been able to find one other case in which strong proof is afforded that the infection could not have been introduced through an opening made in the bag of waters during labour. In 1891 Nieden published a case of blennorrhagic conjunctivitis in a child born in the amnion; when the amnion was opened the eyes and face were cleansed with corrosive wool and sterilised water, yet purulent conjunctivitis developed twenty-four hours after birth.

In the case which Armaignac describes the child was born at the eighth month with a purulent conjunctivitis; the labour pains had only lasted an hour and a half, the midwife broke the bag of waters three-quarters of an hour before the expulsion of the foetus; *immediately after birth* the lids were noticed to be swollen, red and tense, and a drop of pus was seen to escape from between them, pus was also seen coming out of the vagina. An hour later the family

physician arrived and confirmed the existence of purulent ophthalmia in full period of suppuration; already the corneæ were white and macerated, and difficult to examine on account of the swelling of the lids. The eyes were treated with the usual antiseptic remedies, yet when the child was seen on the tenth day by Armaignac there was extensive ulceration of both corneæ, and abundant conjunctival suppuration. Notwithstanding the most careful treatment, and although the conjunctival suppuration was arrested, four days later the right lens was spontaneously ejected and the left followed five days after the right one; in a few weeks' time there remained in each eye a leucoma adherens and only a vestige of transparent cornea.

Two years previously the mother had a child who had been attacked with purulent ophthalmia; she herself during her second confinement had suffered from metritis. After the case of Nieden, in which the amnion was complete at birth, but in which ophthalmia declared itself twenty-four hours later, this is the one in which the shortest interval has elapsed between the rupture of the bag of waters and the birth, viz., three-quarters of an hour, and it appears to be the only case in which science has been able to demonstrate purulent ophthalmia in full evolution one hour after the rupture of the bag of waters. If the gonococci from the maternal vagina had been transported directly through the opening in the pouch, then an active virulence much in excess of what is known as the period of incubation would be necessary to account for it, and the case of Nieden would still remain, so that it is necessary to look for another mode of infection. He adds that Kraus, of Vienna, has demonstrated the penetration of gonococci into the tissue of the uterus, where they give rise to a specific metritis; and why should they not make their way from there into the amnion, or through the wall of the ovum even without going through the wall of the uterus?

If chemical substances which have been injected into the body of the mother pass rapidly and directly into the amniotic fluid without the intermediary of the foetus, why should not microbes, which by themselves have the

power of penetrating rapidly and deeply into living tissues? No one doubts that the fœtus may be infected by way of the placenta, even here the microbes have to pass the thin membrane which separates the maternal and fœtal circulations; it is then only a question of the thickness of the membrane which has to be penetrated. It is for this reason that Armaignac thinks that one ought to adopt the theory that the microbes penetrate directly through the membranes of the ovum, but he adds that ante-partum purulent ophthalmia and vulvitis might also result from the direct transportation of the gonococci in the maternal blood. This theory does not appear so plausible, although ante-partum purulent ophthalmia may sometimes be due to specific metritis.

E. M. LITHGOW.

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ANDOGSKY and SELENSKY (St. Petersburg). The  
Rôle of Scleral Scars in Sclerotomy. *Knapp's  
Archives of Ophthalmology*, xxxi., 5, 1902.

So varied and so diametrically divergent are the views of ophthalmologists regarding the value of sclerotomy in glaucoma, and the mode in which it exerts the beneficial influence which can hardly be denied to it, that the two observers have thought it best to attack anew the question of the permeability of scleral scars microscopically and micro-chemically. Their method was to perform sclerotomy on a number of rabbits, with or without co-incident iridectomy, to instil eserine, then after a period varying from eight to one hundred and forty-five days, to make injections into the anterior chamber either of citrate of iron or of Indian ink emulsion. This was done under a pressure of 41 to 45 cms. of water, avoiding the very high pressures used by some previous observers; the pressure chosen was very slightly higher than the normal intra-ocular tension of the rabbit's eye. The injection was allowed to go on for about thirty minutes.



De Wecker believes that every scar which can be called a filtration scar develops under high pressure only, but the observers consider that when the sclerotomy scar has properties on which the success of the operation depends, these properties do not appear to have anything to do with increased tension. When sclerotomy is performed upon a glaucomatous eye, the aqueous humour drains away, but if, as sometimes happens, the tension does not at the same time come down, is it to be expected that it will be relaxed at a later period, when the aperture is less free than at the moment of operation? In such a case the scar is formed under the condition of increased tension, and may have such and such characters in virtue of that fact, but these characters cannot be regarded as remedial in character. The researches of the two authors seem to indicate that under certain conditions the scars following sclero-corneal sections influence the secretion of aqueous humour, in that the current is accelerated for a time in the region of the scars. They judge that the contents of the anterior chamber may pass through the scar in three ways, namely, by absorption along with blood and lymph streams, and by passing through the substance of the scar into the episcleral space. One point of great clinical importance was brought out in these investigations, that the freedom of permeability depended very greatly upon the age of the scar; when the operation had been done less than fourteen days previously, the passage of pigment was very evident, but little passed through when the scar was from three to six weeks old, and after that time practically no trace of filtration could be discovered. The conclusion arrived at therefore is that scleral scars possess a certain permeability at a certain stage of their development, but not to a degree so high as to form a valid argument in favour of the filtration scar theory. The fact that the permeability is of so brief duration helps greatly to explain what most surgeons have found to be the case clinically—the transitory character of the therapeutic value of a sclerotomy as compared with an iridectomy; it occupies a position midway between an iridectomy and a simple tapping of the

anterior chamber. In a case in which the iris may be lying in contact with the cornea, but not actually adherent to it, sclerotomy may give just the temporary effect required to enable a myotic again to open the angle and relieve the high tension, at least for a time; but where there is already any adhesion, sclerotomy can only have a very temporary influence upon the progress. In such a case iridectomy is clearly the better procedure.

W. G. S.

E. HEIMANN (Charlottenburg). Unilateral Nystagmus. *Klinische Monatsblätter für Augenheilkunde*, August and September, 1902.

O. NEUSTÄTTER (Munich). Unilateral Nystagmus. *Centralblatt für praktische Augenheilkunde*, October, 1902.

Heimann divides cases of unilateral nystagmus into three classes: (1) Cases occurring in highly amblyopic misdirected eyes; (2) cases occurring in the course of severe nervous diseases; (3) cases of a transitory nature accompanying or following spasmus nutans.

In class 1 the nystagmus usually dates from early childhood; the movements are less regular than in ordinary nystagmus and slower. In class 2 the disease may start at any period of life, the eye symptoms being only a subordinate feature in the general nervous affection. In class 3 the movements are very rapid, *e.g.*, 120 per minute. The nystagmus is increased on fixation being attempted or the head being fixed; the prognosis in such cases is good.

Discussing the origin of unilateral nystagmus, Heimann thinks Neustätter's theory of an interruption or obstacle situated in the path of the fibres connecting the centres in the eye muscles is somewhat far-fetched. He supposes that as a child acquires binocular fixation, connections are established between the motor nuclei of the two sides. If one eye has very poor vision these connections

are never acquired. The good eye fixes and the amblyopic eye is misdirected and may develop slow nystagmic movements. In cases of spasmus nutans with nystagmus, he assumes the theory of insufficient illumination as the cause of the affection to be correct. In the poorly lighted room the child has greater difficulty than usual in acquiring fixation, and any functional difference between the eyes is apt to cause the weaker eye to take on nystagmic movements.

Neustätter, in his article, reiterates views previously expressed as to the theory of unilateral nystagmus. He believes in the closest association of the motor centres, but supposes in cases of unilateral nystagmus an obstacle to exist to the conduction of impulses situated mesially in the path of the fibres connecting the centres of the two sides. This obstacle he considers to be sufficient to check the weak stimulus of nystagmic movement from crossing, while the powerful impulses to associated movements, reflex or voluntary, are not interfered with, and the eyes may be moved freely in all directions. He regards unilateral nystagmus as merely a modification of the more usual bilateral form.

J. V. PATERSON.

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**J. HERBERT PARSONS.** Degenerations following Lesions of the Retina in Monkey's Brain  
*Part 3, 1902.*

In this experimental research a lesion of a monkey's retina was made by means of a Graefe cataract knife; observations were made on six monkeys. The animals were killed from a fortnight to three weeks after the retina had been injured, and the resulting degeneration of the nerve-fibres was traced in the optic nerves, chiasma, and optic tracts. The parts were hardened in formol, then washed with water and transferred to Busch's solution; they were then embedded in celloidin.

Parsons finds that the degeneration in the optic nerve

on the side of the lesion corresponds, upon the whole, with that found by other observers in rabbits. The different parts of the optic nerve correspond in general to the similarly situated parts of the retina, but he finds "that in the posterior part of the nerve as it approaches the chiasma, the nasal fibres tend towards the ventral side, and the temporal fibres tend towards the dorsal sides." The course of the papillo-macular bundle in the optic nerve of the monkey, as determined by experiment, would appear to correspond with that in the optic nerve of man as found by pathological investigation of cases of toxic amblyopia, in which the papillo-macular bundle is particularly affected. The author confirms the observation that signs of degeneration are found in the optic nerve of the uninjured side, and believes there is a true degeneration of inter-retinal fibres.

Both optic tracts were found degenerated in every case. This is partly explained by the diffuse injury which probably always results from the lesion, and is manifested by diffuse degeneration in the nerve, but it is not attributed to this entirely. Since more fibres appear to be degenerated in the tracts than in the nerve, the author is forced to conclude that a sub-division of the fibres occurs.

In some of the experiments apparent degeneration was found in the third and fourth nerves, but this is not considered to be a true degeneration.

C. H. U.

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## OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

JANUARY 29, 1903.

Mr. W. LANG, Vice-President, in the Chair.

### CASES AND CARD SPECIMENS.

*Coloboma of the Optic Nerve.*—Mr. L. Werner. The patient, a girl aged 19, noticed that her right eye was somewhat defective visually and was smaller than the left.

On examination the right disc showed a large and deep excava-

tion, having in places a pigmented border, in size about 4 disc diameters. The lower edge of the excavation was narrow and rounded, with a few small vessels curving round it. The upper wall of the excavation sloped backwards from its edge for some distance, forming another and deeper excavation, while inside and to the left was another still smaller cavity. The centre of the excavation was of a brilliant white in appearance. The whole of the disc was, in fact, replaced by the above-mentioned excavations. V. = finger counting to the outer side. Mr. Werner considered this to be a minor degree of the same condition which leads to the production of anophthalmos with congenital cyst of the lower lid. He pointed out that in coloboma of the nerve sheath the cystic excavation is most usually pronounced below.

*Congenital Malformation of the Lower Eyelids.*—Mr. F. A. C. Tyrrell. The patient, a lad aged 16, showed distinct flattening of the right side of his face due to arrested development of the malar prominence, on the left side there was also considerable flattening, but not to such a marked extent as on the right. The lower part of the orbital margin and the lids on the right side were very poorly developed, with a notch in each lower lid, more marked in the right. The vision of the right eye was  $\frac{5}{6}$  and J. 1, and the fundus showed a slight notch at the outer side of the optic disc; the left fundus was normal. There was no obtainable history of any error in development in any other member of his family.

*Changes in the Macular Region following Contusion of the Eye.*—Major M. T. Yarr. The patient, a man, had been struck in the right eye some eight months previously by the cork out of a ginger-beer bottle. At the time he felt little inconvenience, but five months later, when ordered a course of musketry instruction, he was astonished to find that he could not see the bull's-eye on the target at 200 yards, whereas a year before he had been a "marksman," which means accurate shooting up to and including 800 yards. The left eye was normal.

In the right a small excentric nebula was noticeable on the cornea, possibly due to the injury. In the fundus well-marked pigment disturbance in the choroid in the form of irregular smudges in the papillo-macular region, forming an irregular line extending from the papilla to the macula, and patches of choroidal atrophy in the same situation, were also noticed. The changes, presumably due to hæmorrhages, were all on or behind a large inferior temporal vessel. V. =  $\frac{6}{24}$ , and J. 10 badly. There was no evidence of syphilis.

*A Case of Favus of the Upper Eyelid.*—Mr. E. T. Collins. The patient, a lad aged 16, showed some slight scarring of the right upper eyelid. When first seen the skin of the right upper lid about midway between the free margin of the lid and the line of the brow showed four circular patches composed of a dry crust, the centre of each being depressed and black, with slightly raised margins of a bright sulphur-yellow colour. The smallest patch, measuring 4 mm. in diameter, was perfectly round. The largest, 7 mm. in diameter, had a scalloped margin and looked very much like a piece of lichen. The other two patches touched one another and were becoming confluent. No hairs connected with any of them could be seen. There was no discharge and the surface of each was quite dry; the skin surrounding the patches was red and inflamed. A portion of one of the crusts examined microscopically showed a branching mycelium composed of ovoidal segments and numerous spores. A portion of the crust planted on maltose agar gave rise to a growth characteristic of the favus fungus.

The commencement of the skin affection was a small red pimple, which after being rubbed became sore: later other spots appeared. A source of infection was carefully enquired for, but nothing ascertained.

*Sections from Nævus of the Orbit.*—Mr. Holmes Spicer. The patient from whom this nævus had been removed had been brought before the Society some three years ago. There had been proptosis of one eye for some years, but lately it had increased a good deal. No operation had been deemed advisable until the cornea had sloughed, when the eye had been removed. During each pregnancy the nævus had increased enormously.

The interest in the case lay in the ease with which the tumour came away during the operation; though great hæmorrhage was expected none took place, for the nævus was isolated to a single pedicle in the centre of the orbit. In the sections shown it appeared to be a pure nævus having a rich arterial blood supply with a large amount of muscular tissue in it—apparently the hypertrophied rectus muscles.

*Aneurismal Dilatations on Diseased Retinal Arteries.*—Mr. J. H. Fisher. The patient, a lad aged 13, complained of defective vision. V. = R.  $\frac{6}{24}$ ; L.  $\frac{1}{12}$ ; both badly. Right eye examined ophthalmoscopically showed the presence of some retinal change in the shape of a large plaque, white and glistening, and not quite homogeneous, situated to the outer side of the macula and extending in an upward and outward direction; just beyond this two diseased retinal arteries were seen showing a series of small local

dilatations, aneurismal in character ; the dilatations were closely placed and in series, giving the artery a beaded appearance. Patches of white retinal change were also observable at the temporal and upper nasal periphery of the retina, and in the latter situation one or two dilatations on the arteries were seen similar to the others. The veins, generally, presented a moniliform appearance. The left fundus was normal. These changes in the vessels were apparently progressive ; a few flecks of reddish colour close to the diseased vessels pointed to hæmorrhage. Since the patient was first examined more dilatations have appeared on other vessels. The patient had rheumatic fever when 5 years of age, and when 7 years of age became an in-patient of a children's hospital suffering from cardiac disease, the heart being dilated, chiefly on the left side, with weak sounds and a soft systolic murmur.

#### PAPERS.

*Primary Extradural Tumours of the Optic Nerve* (with lantern demonstration).—Mr. J. Herbert Parsons. The subject of this paper was brought under the consideration of the writer by a case which had lately come under his notice. The patient in this particular case was a little girl, aged 7, who while playing with her father had her left eye accidentally bruised by his finger ; nothing, however, was noticed immediately, but the next morning it was noticed that the left lid had “dropped.” Later the child was taken to a children's hospital because she was getting thin, and it was there noticed that the left eye projected somewhat, and the lid drooped. She also had headache which was attributed to a discharge from the left ear, slight attacks of vomiting, and suffered greatly from “night terrors.” Later when admitted into Moorfields Hospital, an abnormal bony prominence was felt at the left lower orbital margin near the inner angle. There was also ptosis, exophthalmos, with limitation of movement in all directions, and marked optic neuritis, with  $\frac{6}{8}$  vision. An exploratory incision was first made into the orbit, and the whole orbital contents were then exenterated. The mass removed included the globe, eyelids, and the entire contents of the orbit, surrounded by a dense white mass of growth, which on the inner side projected forwards to the orbital margin, forming the hard prominence felt through the skin in this position. The growth entirely ensheathed the globe intra-orbitally, and at the apex of the orbit closely surrounded the optic nerve, and apparently extended along it into the skull cavity. Microscopically it consisted of dense white tissue, almost cartilaginous in consistence, fibrous in nature, mostly hyaline, with a

variable number of cells. The blood-vessels, scanty in the deeper parts, showed well-marked endothelial proliferation, and there were indications of the same process elsewhere, but no definite masses of concentric cells, nor any patches of calcification. The growth clearly belonged to the connective tissue group, and though the embryonic character of the cells was not specially evident, from its progressive and infiltrating qualities it was clearly sarcomatous in nature, and from the preponderance of fibrous tissue in it, probably a fibrosarcoma. The tissue was directly continuous with the sclerotic and dural sheath of the optic nerve.

A survey of the literature on the subject and the recorded cases revealed only 18 cases of extradural growths, whereas some 102 cases of the true or intradural tumours of the optic nerve are collated by Dr. Byers. Out of these 18 cases the following more or less accurate details are gathered: Most occurred before 10 years of age; the condition was more frequent in males, whereas the patients with intradural tumours were more frequently females. The left eye was most usually attacked, as in intradural tumours. Injury to the eye was rarely mentioned in the histories of these cases. With regard to the symptoms of primary extradural tumours, exophthalmos was present in all the cases reported, the direction being straight forwards, its progress was almost invariably slow and even, spreading over months or years. Extradural, like intradural, tumours were usually painless. The movements of the eyeball were usually restricted, but to a very variable degree. Vision was usually normal at first, but later on failed slowly and gradually. Ophthalmoscopically optic neuritis of the choked disc variety was the rule, with only occasional hæmorrhages. In no case has the globe been implicated directly in the growth, but merely surrounded by it. Considered pathologically, extradural tumours show a remarkable similarity in general type to the intradural, which casts some doubt on the supposition that any of these tumours spring from the optic nerve itself; they probably arise from the nerve sheaths in all cases, with the exception of the true gliomata. Out of the 18 reported cases there are only 12 which can be relied upon with any certainty as being true primary extradural tumours of the optic nerve, and of these 9 were certainly endotheliomata. As to diagnosis of these tumours from intradural growths, it is usually impossible, but the more prolonged maintenance of fair vision in the case of extradural growths is of some value. With reference to prognosis, the malignancy is essentially a local one, and in most cases metastasis need not be feared. The impossibility of completely eradicating intracranial extensions renders the



prognosis at all times exceedingly grave, recurrence frequently taking place locally. Treatment solely consists in as complete extirpation as possible: in some cases the eye has been preserved. Mr. Parsons was of the opinion that Krönlein's operation is undoubtedly indicated, and that the eye should be retained whenever possible.

*Ossification of the Choroid.*—Mr. Thomas Snowball. The writer stated that the presence of bone in the eye was not an infrequent occurrence, and that its presence in the uveal tract, more particularly in the choroid, was the most usual situation. He stated that whereas some observers hold the capillary layer to be the exclusive seat of its origin, others hold that the bone is laid down most frequently internal to the membrane of Bruch. The paper consists in a detailed account of the microscopic examination of several eyes in which bone was found, and a comparison between the results arrived at in these cases and the results obtained by other observers.

CASE 1.—Eye injured by blow sixteen years before enucleation, layer of bone in posterior part of the choroid round the entrance of the optic nerve, and extending as far as the equator on one side. Microscopically the portion containing the bone consisted of (1) an outer layer comprising the supra-choroidea and choroidal stroma, and (2) an inner layer made up of fibrous tissue in which the bony plate was situated, the chorio-capillaris having to a great extent disappeared. No trace of Bruch's membrane was to be found external to the bony plate. The fibrous layer lining the inner border of the ossified plate was entirely devoid of retinal epithelium, the lamina vitrea was seen to run for a short distance internal to the bone, and to disappear in a small mass of osteoid tissue lying directly on the bone itself. In the bony plate a delicate open meshwork with osteoblasts, and true bone corpuscles in the deeper layers, were readily made out. The retina in this case was converted into a fibro-cellular mass.

CASE 2.—A blind shrunken eye removed from a man, aged 22; no history obtainable of how or when it became blind. Microscopically the bony plate on the inner surface of the choroid formed a collar round the entrance of the optic nerve and extended a short distance along the side of the retina at the point of its attachment at the optic disc. No continuous chorio-capillaris was to be made out, the lamina vitrea was absent, the bony plate was enclosed in a layer of dense fibrous tissue having only a few degenerated retinal pigment cells on its inner surface. The bony plate showed all the characteristics of true bone. The cornea in

this specimen showed marked calcareous degeneration in its anterior layers.

CASE 3.—Eye removed from a woman, aged 21, who had lost the sight of it since 9 years of age. The retina was detached in a funnel shape, and a plate of bone 2 mm. thick in its thickest part lined the inner surface of the choroid, except immediately round the entrance of the optic nerve, but in this situation some bone was in process of development. Microscopically, the bony plaques replaced the chorio-capillaris, and these plaques were surrounded by fibrous tissue. The choroid opposite the larger bony plaques was detached from the sclerotic on both sides, and showed degenerative changes, breaking down of the pigment stroma cells and absence of Bruch's membrane, the bone having developed in places immediately on the inner surface of the pigmented stroma, in parts separated from it by a layer of fibrous tissue. Fibrous tissue lined the inner surface of the bone and filled up bays in it, and in one spot to one side of the disc this fibrous tissue was covered by a layer of retinal pigment. The inner layers of this fibrous tissue apparently consisted of remains of Bruch's membrane. A mass of fibrous tissue taking the place of the lens in this eye also showed a small plate of bone.

CASE 4.—Left eye of a woman, aged 22, who when aged  $2\frac{1}{2}$  had fallen down and run a fork into the eye. This eye showed transverse calcareous film on the cornea, and thickening of the sclerotic at the posterior pole, with a mass of the shrunken detached retina, and several pieces of bone, also many small white dots—foci of bone formation. The chorio-capillaris was in places replaced by fibrous tissue. Colloid bodies were also present under the retinal epithelium, in one of two of which a process of ossification was proceeding, the retinal epithelium remaining as an internal covering to the ossifying colloid bodies. The larger plates of bone were similar to those in the other cases, being elongated plates lying in fibrous tissue in the capillary layer of the choroid, in places quite close to the pigmented stroma, with absence of the retinal pigment in most places, and where Bruch's membrane was present the bone lay with its fibrous envelope distinctly external to the lamina vitrea.

CASE 5.—Eye of a girl, aged 13, with the history of several attacks of inflammation. Only one small plaque of bone was here found developed in the choroid itself, its inner layers, the chorio-capillaris and lamina vitrea, having been replaced to a large extent by fibrous tissue in which the bone was formed. The cornea also showed patches of calcareous degeneration.

CASE 6.—Eye, history of which is unknown ; two small masses

of bone were present on the inner surface of the choroid developed in fibrous tissue in the atrophied stroma. No lining of retinal pigment, and the fibrous tissue partly replacing the chorio-capillaris.

CASE 7.—Buphthalmic eye removed from a man, aged 28, first affected when 5 years of age. The choroid almost entirely detached from the sclerotic, much disorganised and represented by a pigmented fibrous layer which contained here and there hæmorrhage, and internal to this a thin shell of bone composed of two layers of compact bone with cancellous tissue between them. Bone was also present in the lens and in the degenerated retina.

The writer pointed out that in all these cases the average time from the disorganisation of the eye until its removal was fifteen years, that bone had been found in eyes of patients ranging from 11 years to 102 years of age, and more cases are recorded of its having been found in eyes of male than of female patients. In the majority of cases the eye containing bone formation was one lost through some perforating injury, or some inflammation of the cornea followed by perforation ; in a few cases, however, the eyes were destroyed by chronic inflammation with plastic exudation, which later led to extensive degenerative changes in the parts chiefly affected, but in each case the sound eye was never reported to have been affected sympathetically. As a result of these chronic inflammations in the choroid the outer pigmented layers were found reduced to a fibrous band, and the inner layers, the chorio-capillaris and membrane of Bruch are for the most part absent in those areas where bone has developed. In these areas the capillary layer where it was still present was never a continuous one, but at most represented by only a few vessels lying in a layer of fine fibrous tissue, and the membrane of Bruch had entirely disappeared, and in no case was any trace of it lying on the choroidal side of the bone-containing fibrous layer. In nearly all cases the bone had been developed in the posterior part of the choroid round the entrance of the optic nerve, and the writer thought this was due most probably to that particular part being furnished with a richer supply of nutritive fluids on account of the presence there of the short ciliary arteries ; this would intensify any inflammatory changes and give rise to more exudation. He was of the opinion that bone in the choroid was never developed through cartilage but was always of the periosteal type. He considered that the osteoblasts were developed from embryonic cells which still remained in the choroid from foetal life, and were stimulated into growth by the long-standing inflammation or irritation, forming first fibrous tissue, then bone ; he also agreed with the theory

that the connective tissue corpuscles become converted into real bone corpuscles. The paper concluded with a comparison of the various theories to account for the presence of bone in the choroid, with an extensive list of authors and recorded cases.

*Hyaline Nodules (Drüsenbildungen) on the Optic Disc.*—Mr. A. S. Morton and Mr. J. H. Parsons. The writer prefaced this paper with the remark that "the presence of hyaline bodies called by the Germans *Drüsenbildungen*, or granular formations upon the optic disc, was a rare occurrence," and as he had had the opportunity recently of making a pathological examination of such a case, he thought a report of it would be useful.

Ophthalmoscopically the disc in such a case is usually found to be swollen, this swelling amounting to 12 or 14 dioptries at times. The vision is often unimpaired, but in some cases retinitis pigmentosa has been present. On a closer examination of the swollen disc it will be found to be due to masses of translucent nodules variously situated, but most usually involving only the central part of the disc surrounding the vessels at their exit from it. In other cases these bodies will be found only at the edge of the disc, obscuring it and giving rise to the appearance of optic neuritis, at times completely surrounding it, at other times covering its whole surface and even invading the surrounding retina for a limited distance. Both eyes are usually affected, and not always to the same degree. The writer gives abstracts of forty-two cases of this affection, in seven of which retinitis pigmentosa was reported to have been present, diminution of light and colour-sense with contraction of the fields, pointing to a condition of malnutrition, in some cases merely local but in many others associated with nervous disorders. Injury appears to have some etiological relationship with the complaint, and in some cases of injuries to the skull the condition has been unilateral. A review of the cases shows that the condition commences in early life, that males are affected in slightly larger proportion, and that the condition occurs in the large majority of cases in both eyes. The prognosis both for the eyes and for life may be considered good, though associated disease must be reckoned with separately. Pathologically most observers take the view that these bodies are colloid bodies, the writers, however, are of opinion that these bodies represent a form of exudate which has been invaded by osteoblasts derived from the choroid, the exudate perhaps having been laid down in layers, the older parts becoming gradually calcified and still later ossified, thus giving rise to the hyaline bodies.

*Two Cases of Tumour of the Optic Nerve, in one of which Krönlein's Operation was Performed, with Preservation of the Eye.*—Mr. L. Werner. These cases were both primary intradural tumours.

CASE 1.—A woman, aged 45, twelve months before admission to the hospital had noticed a slight swelling above the inner canthus of the left eye, which gradually began to protrude. She had suffered no pain, nor had she had vomiting or headache; she had never seen double. The displacement of the globe was very pronounced, directly forwards and outwards in the direction of the axis of the orbit; movements were comparatively free. The margin of the orbit was normal and no pulsation or bruit could be heard or made out. The vision was reduced to P.L.; the optic disc was white and atrophic. Temperature normal. All the signs pointed to tumour of the optic nerve, so it was decided to remove it by means of Krönlein's method and that an attempt should be made to preserve the eye in spite of its being blind. Under the anæsthetic a solid tumour could be felt behind the eyeball. The external angular process of the frontal and the frontal process of the malar were exposed by curved skin incisions and the triangular piece of bone thus exposed was turned back after being chiselled from its bony attachments, but still retaining its connection with the soft parts. The orbital periosteum having been divided horizontally and turned aside, a large tumour apparently growing from the under surface of the optic nerve became visible behind the eyeball. The whole of the tumour, which filled the apex of the orbit, was removed, with a small portion of the nerve uniting it to the eyeball. The posterior surface of the growth was lined with smooth capsule and no trace of nerve was seen here. After removal the eyeball was readily pressed into its normal position, and at the end of five days the skin incisions had united; the ptosis, however, remained. The tumour examined microscopically was found to be a modified sarcoma, there being complete absence of intercellular stroma, and the cells were grouped in rounded oval or irregular clusters. A section of the nerve and tumour where together showed that what appeared to be the nerve was in reality tumour tissue lying within the pia sheath, while the nerve tissue proper was reduced to a flattened band not more than 1 mm. in thickness, raised up on the tumour tissue and compressed against the upper part of the pial sheath.

CASE 2.—This patient was a little girl, aged 5, whose right eye some fourteen months previously had become divergent and then proptosed until she was unable to close it; the protrusion was quite painless and a growth could be felt above the eyeball.

There was marked optic neuritis. The eyeball was enucleated with the anterior portion of the tumour attached to it; the rest of the growth was removed separately. In the course of a week a dusky swelling and induration of the upper lid and cheek had taken place, the lid was well scraped and chloride of zinc applied, which gave rise to the separation of a yellow slough. A bad prognosis was given. The portion of the tumour removed with the eye was encapsuled and attached to the eye by a small piece of apparently healthy nerve. Microscopically the nerve could be seen passing through it enclosed in the pial sheath, but the greatly enlarged intervaginal space was occupied by the growth. The tumour sprung from the outer layers of the pial sheath, and was called a fibro-myxoma or myxo-sarcoma. The writer enlarged upon Krönlein's operation, strongly recommending it when possible, especially in the following conditions: cysts and tumours of all kinds within the orbit, injuries and foreign bodies, retrobulbar abscess, and pulsating exophthalmos. Primary tumours of the optic nerve in general were treated of, the writer stating that, judging by the result of recorded cases, the danger to life was very considerable, but that in spite of incomplete removal in many cases local recurrence had not taken place.

Mr. Lawford, in the discussion which followed the reading of this paper, said that though Krönlein's operation had hitherto been reported only once in the United Kingdom, it had been performed several times; he himself had performed it once.

REGINALD E. BICKERTON.

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### CLINICAL NOTES.

EVISCEATION WITH IMPLANTATION OF FAT.—In order to obtain a better stump than otherwise might have resulted in a certain case, Troncoso (Mexico) had recourse to a singular method, suggested first, we are told, by Barraquer, namely, the insertion into the scleral cavity, after evisceration, of a mass of fat cut from the gluteal region. He believes that such a substance, by becoming vascularised, has a better chance of being permanently retained than has a globe of glass or metal.—*Journal of Eye, Ear and Throat Diseases, Baltimore, July, 1902.*

## AFTER RESULTS OF SIXTY-THREE OPERATIONS FOR DEPRESSION OF THE LENS PERFORMED BY INDIAN "CATARACT-PRICKERS."

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I HAVE kept notes for some years in district practice in India of cases of depression of the lens met with, the following summary of which may be of interest in view of Mr. Henry Power's plea for the occasional performance of depression.<sup>1</sup> The cases have not been selected, but represent those which time and opportunity allowed me to note, and occurred chiefly in patients coming for extraction of the cataractous lens in the remaining eye.

The history of "cataract-pricking" is of course as old as the history of ophthalmic surgery, and its mode of performance in the East and the instruments used have been described in the *Transactions of the Ophthalmological Society*.<sup>2</sup> It need only be mentioned here that the "suttya" or "mal" who couches in India (in Bengal, at any rate) introduces his needle through the cornea and not through the sclera, and in depressing the lens he is indifferent as to whether he merely depresses it (*depressio*) or turns it over (*reclinatio cataractæ*).

Professor Hirschberg, when visiting India several years ago, was much struck, as we all are at first, with the occasional good result of the operation as

performed by itinerant quacks, and attributed it to the earlier age at which cataract ripens in India, and to the danger of depression being less in middle than in advanced life.

The notes of the individual cases are too long to print, so the facts collected are grouped under the following heads :—

(1) *Duration of Vision after Couching.*—Of the sixty-three eyes examined thirty-nine (61·9 per cent.) obtained good or fairly good vision for varying periods. When examined twenty-nine only (46 per cent.) had retained such good vision, thirteen had p. l. only, thirteen had no vision though the eyes looked well, and eight had shrunken globes. In the thirty-nine eyes that had or had had good sight the average duration of vision up to the time of my examination was 4·88 years. In other words, thirty-nine obtained and retained good vision for an average period of 4·88 years. Fifteen eyes retained good vision for one year or less, sixteen, however, kept it for five years or more, and seven of these for ten years or more.

(2) *Degree of Vision after Couching.*—Of the twenty-nine eyes with good or fairly good vision when examined, thirteen were tested with glasses by means of square test dots as described in a previous paper.<sup>8</sup> Five eyes gave  $V. = \frac{6}{6}$ , one each  $\frac{6}{9}$ ,  $\frac{6}{12}$ , and  $\frac{6}{24}$ , three gave  $\frac{6}{18}$ , and two  $\frac{6}{36}$ . The remaining sixteen were noted as having good or fairly good vision, but were not tested with glasses.

(3) *Influence of Age and Sex.*—Fifty eyes were of male, and thirteen of female patients. The average age when couched was 52, twenty-two were over 55 years of age. These gave in eleven eyes good vision, in two p. l., in seven no vision, and two had shrunken globes; thirty were between 40 and 55, and of these fourteen had good sight, eight p. l., four nil, and four shrunken eyes; seven eyes were in patients under 40



years of age, and out of these five obtained good vision and two none at all.

There is no exact way of ascertaining natives' ages, but as far as these figures go age would not appear to influence the results.

(4) *Relation between Fixity of the Displaced Lens and Vision Obtained.*—In eight eyes the lens was fixed in the vitreous with seven good results (four of them having  $\frac{6}{6}$ ), and no vision in one eye; in eight eyes the lens was movable, and of these six had good vision ( $\frac{6}{12}$ ,  $\frac{6}{18}$ , and  $\frac{6}{18}$ ), and two had p. l. only. The results are better, as indeed might be expected, when the lens is fixed. The constant concussion of a movable depressed lens is certain to be more injurious than the presence of a lens fixed by adhesions.

(5) *Variations in Tension.*—(i.) *Increase.* Ten couched eyes had increase, mostly of + 1, but in two of + 2. Five of them showed other signs of glaucoma and five did not. Of the latter, four had good vision and one p. l. only. Of the five former only one had p. l. (see below), the rest being blind. One of them, however, had had good sight for twelve years, and had only had glaucoma and loss of sight for four months, while the fellow eye still had good vision twelve years after couching, though with T. —2.

Three other couched eyes (not included in the above) had normal tension themselves, but their fellow eyes had glaucoma (coming on  $\frac{8}{12}$ , ten and thirteen years after the couching operation), for the treatment of which the patients came. As all three had good sight in the couched eye, there was no reason to suppose that this had been glaucomatous when couched, or that the connection was anything but accidental. The case included above as one with glaucoma and p. l. remaining was the only one in the series in which the appearances and history made it probable that the "suttya" had couched for glaucoma

and not cataract. Both eyes were glaucomatous, though only one had been couched.

(ii.) *Decrease* was found in fourteen eyes, eight of which had good vision, two p. l., and four none. Nine eyes had  $-1$ , three  $-2$ , and two  $-3$ , one in the last group giving  $V. = \frac{6}{36}$ , and one being blind.

(6) *Influence of Couching upon Subsequent Extraction in the Fellow Eye.*—Thirty-five extractions of cataracts were performed in eyes whose fellows had been couched with the following results : twenty-seven eyes obtained good vision, three p. l., and five no vision. This high proportion of failures—22·85 per cent.—compared with the proportion met with in other extractions (6·82 per cent.)<sup>4</sup> is noticeable. The failures in the extractions occurred chiefly in patients with couching failures, and it seems just as likely that the cause lay in some constitutional condition of the patient as in any evil influence of the previous couching.

(7) Twice attempts were made to remove lenses that had been couched. The sight had begun to fail, and the patients urged that something should be done to prevent it getting steadily worse, as it almost invariably does when once it begins to fail. One case was successful ; the other failed. It may be justifiable to attempt the removal of a recently couched lens. If not recent, and more especially if the lens is fixed, it is wiser to leave it alone even if the sight is failing.

CASE 1.—In 1894, man, aged 60, both lenses couched twelve years previously. R. E. lens fixed low down in vitreous. V. = counted fingers well. L. E. lens behind and adherent to iris, partly obstructing pupil V. = first counted fingers. Removed by ring scoop after escape of vitreous. He obtained good vision.

CASE 2.—In 1899, man, aged 55, both eyes couched one and a half years previously.  $V = \frac{6}{6}$  with glasses in each eye, but patient stated that his left eye was failing, and he could not see at night ; its tension was  $+\frac{1}{2}$ . At the

operation vitreous escaped at once in small quantity, lens was caught by ring scoop, but found too firmly fixed to move and the attempt caused much pain. It was left. Final results =  $\frac{6}{9}$  in the left eye. A fortunate ending.

*General Remarks.*—The broad *result* brought out by these cases is that twenty-nine out of sixty-three cases of depression, or 46 per cent., retained good vision after an average interval of nearly five years. Two influences weaken the value of these figures, though in opposite directions. Couchers sometimes depress simple chronic glaucomatous eyes, mistaking or not caring about the disease for which they operate. Only one of this series appeared to have had glaucoma when couched. On the other hand, the results are probably better than these figures indicate, because only those dissatisfied with their couched eyes are likely to come for extraction of the other. Of thirty-five so coming thirteen had good vision in the couched eye and twenty-three had p. l. or no vision (eleven p. l., eight *nil* and four shrunken globes). Himby, quoted by Power, had ninety-six per cent. successes in 1843.

The *advantages* of depression are the immediate vision, short confinement to bed, absence of any wound to gape if it heals slowly, lessened danger of sepsis, prolapsed iris or vitreous, intraocular hæmorrhage, and finally the absence of astigmatism, and the normal appearance of the eye in successful cases.

The *disadvantages*, considered apart from the high percentage of lost eyes, are the vomiting and inflammation that often occur at, or soon after, the operation, fairly commonly even in cases that eventually do well according to patients' statements, the irido-cyclitis, chronic glaucoma, and sometimes gradual loss of vision without recognisable organic change, which not infrequently occurs in unsuccessful cases.

Weighing these considerations carefully, one cannot help agreeing with Mr. Power in his conclusion that

*under certain circumstances* it "would be at least allowable, if not advisable, to revert to the ancient method of 'depression' for the restoration of light in cases of cataract."

The chief circumstances mentioned by Mr. Power have been recently given in your columns<sup>5</sup> and need not be reproduced here.

I was able to send over to Mr. Parsons an eye enucleated for glaucoma following upon couching; as apparently there are only on record thirteen instances of such an examination,<sup>6</sup> his report is of much interest.

The clinical notes of the case are :—

Mallum Soo, male, aged 55, left eye removed on November 2, 1901, for increased tension, iritis, hypopyon, &c., following "couching" by a quack, done one year ago. Patient saw well for a few months, but has had pain, redness and lacrymation for five months. Right eye has ripe cataract, and is watering a little, but is not injected. Eye hardened in 10 per cent. formol for twenty-four hours, then in 50 per cent. spirit.

#### PATHOLOGICAL REPORT.

The eye was frozen after removal of the spirit and divided by a horizontal section.

*Macroscopic Examination.*—*Cornea* transparent, somewhat collapsed. *A. c.* full of albuminous coagulum. *Iris* discoloured, pupil small, filled with dense exudate, which passes forward as a pyramidal mass into the *a. c.*, the apex touching the posterior surface of the cornea. *Lens* dislocated, lying firmly fixed upon the ciliary body to the lower and inner side. It is shrunken, probably only the nucleus remaining. It is embedded in exudate, which stretches in all directions through the vitreous. *Retina in situ*, except that it is drawn up slightly into small folds radiating from the lens. *Choroid in situ*.

*Microscopical Examination* (of upper half).—*Conjunctiva* intensely congested and infiltrated with round cells. *Cornea* shows little abnormality. *A. c.* full of coagulum contain-

ing masses of leucocytes, especially in centre between pupil and cornea. Angles open, but full of coagulum; leucocytes and pigment cells. Canal of Schlemm open. *Iris*, marked iritis; the stroma is infiltrated throughout with leucocytes, which in places form closely packed nodules. *Ciliary body* similarly infiltrated: the ciliary processes are somewhat atrophied, and are covered with scattered leucocytes, which are found throughout the vitreous. *Retina*, much degenerated; the rods and cones have everywhere disappeared; the other layers are easily distinguishable, but are atrophic. *Optic nerve*, well-marked true neuritis: the head of the nerve is much swollen, densely infiltrated and covered by leucocytes: the vessels are dilated and engorged. A strand of fibrous tissue stretches forwards from the centre of the disc into the vitreous, probably being a remnant of the hyaloid artery. *Choroid*, vessels dilated and full of blood; not much infiltration: deeply pigmented, probably the normal for a Hindu.

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  - <sup>2</sup> Drake Brockman, *Trans. Ophth. Soc.*, vol. xv.
  - <sup>3</sup> Maynard, *Indian Medical Gazette*, June, 1901.
  - <sup>4</sup> *Ibid*, *loc. cit.*
  - <sup>5</sup> Power, *OPHTHALMIC REVIEW*, vol. xxi., p. 76.
  - <sup>6</sup> Ischreyt, *OPHTHALMIC REVIEW*, vol. xxi., p. 131.
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## REVIEWS.

E. VON HIPPEL (Heidelberg). The Use of Fluorescein to Demonstrate Disease of the Corneal Endothelium. *von Graefes Archiv für Ophthalmologie*, liv. 3.

This paper is the outcome of the author's further investigation of the deep-seated green colouration of the cornea produced by instillation of fluorescein into the conjunctival sac. The superficial staining due to disease or deficiency of the epithelium is not considered. The author contends that fluorescein produces a deep-seated colouration of the parenchyma of the cornea only when the endothelium is absent or diseased.

Clinical observations and experimental evidence are brought forward in support of this view. It is shown that parenchymatous clouding of the cornea occurs when the endothelium is mechanically or chemically damaged. The fluorescein reaction is then positive and the cloudiness remains a good deal longer than the colour reaction. But since parenchymatous cloudiness can occur without direct damage to the endothelium, it was considered necessary to control the clinical diagnosis, made on the strength of the fluorescein reaction, by anatomical means. Von Hippel carried out numerous experiments for this purpose, for the particulars of which the original paper should be consulted.

The conclusions drawn by the author from these are :—

That a deep-seated colouration produced by fluorescein justifies the diagnosis of disease of the endothelium which is at least as extensive as the colouration, but may be larger. A negative reaction does not exclude with certainty the possibility of a lesion of the endothelium. It is safe to be guided by the positive results.

It is not correct to state that every kind of diseased corneal tissue will take on the fluorescein stain.

(1) *Parenchymatous Keratitis*, in which the cloudiness proceeds from the margin and is nearly always associated with

vascularisation, shows no evidence of endothelial disease in the early stages and the fluorescein reaction is negative. On the other hand, if the cloudiness begins centrally, leaving the edges clear or only slightly cloudy, endothelial disease is indicated and the fluorescein reaction should be positive.

(2) *Keratitis Profunda and Keratitis Disciformis* (Fuchs).—Keratitis disciformis gives a very marked fluorescein reaction during the early stage only. The presence of endothelial disease in the early stage is not altogether incompatible with the theory of exogenous infection through epithelial defects (traumatic or herpetic), as suggested by Fuchs, though the absence of reaction in the superficial parts is highly suggestive of an endogenous origin.

Some cases of keratitis annularis (Vossius) give a fluorescein reaction like that of keratitis disciformis.

(3) *Iritis and Iridocyclitis* with deep-lying parenchymatous corneal opacity. The corneal affection is secondary to disease of the uveal tract. The deposits which occur on the posterior surface of an otherwise clear cornea never give a positive fluorescein reaction. In long-standing cases there may be fine, diffuse, deep-lying opacities in front of these, whilst the corneal surface is at the same time partly smooth and partly stippled. Most of these cases give a distinct green colouration, but the deposits on the posterior corneal surface, present at the same time, are never coloured. This reaction, when positive, disappears in six or eight days, but generally reappears with exacerbations. The quick change between intense reaction and its complete disappearance within a few hours is most peculiar.

This deep-seated cloudiness of the cornea, associated with chronic inflammation of the anterior part of the uveal tract, is therefore to be ascribed to endothelial disease. The duration of the cloudiness depends upon the nature of the irritant in the aqueous, and the length of time the latter continues to be pathological in composition.

(4) *Nebulae due to Folding of the Cornea* with the formation of ridges on the back of it after corneal section. Possibly the endothelium is mechanically damaged over the crests

of the folds and so allows the aqueous to enter the cornea. Fluorescein did not give a green colouration, at least not after twenty-four hours.

(5) *Parenchymatous Nebulæ in the Newly Born*.—These nebulæ are due to disease of the endothelium brought about either (a) mechanically, through severe squeezes of the cornea, as in forceps delivery; or (b) through endogenous disease of the globe, which may give rise to intense cloudiness, to ectasia of the cornea, or to hydrophthalmos. The opaque area may be stained with fluorescein.

(6) *Cloudiness of the Cornea in Glaucoma*.—All cases of acute glaucoma showing slight diffuse haziness of the cornea with or without steaminess of the surface give marked deep-seated green colouration with fluorescein. This indicates damage to the endothelium, but that the loss is not extensive is proved by the rapid disappearance of the haziness or green colouration (in half to forty-eight hours) under treatment by eserine or iridectomy. Experiments on rabbits go to show that increased tension alone is not sufficient to account for the haziness and the green colouration, but that there is also an initial lesion of the endothelium allowing of the entrance of aqueous fluid into the cornea.

(7) The author's last series of observations consists in the microscopical examination of four eyes excised for chronic iridocyclitis with parenchymatous and bullous secondary keratitis, and showing deposits on the back of the cornea and steaminess of its surface. All the results lead him to the conclusion that in all the various diseases in which the central parts of the cornea are alone or mostly affected, there is a pathological condition of the endothelium which leads to haziness and steaminess of the cornea. This condition is due to the formation of spaces and vesicles in the epithelium, which have been shown by Fuchs to be due to the entrance of aqueous fluid into the parenchyma of the cornea, and this, again, is permitted by a pathological state of the endothelium. Some of them may also be due to the entrance of fluid from parts other than the aqueous chamber.



Pronounced inflammatory processes in the anterior part of the uveal tract do not appear to be necessary for the damage or destruction of the endothelium. This may be produced by chemically altered aqueous, as is shown by the inhalation of ethylene chloride, (in dog) causing, when it gets into the anterior chamber, a necrosis of the endothelium which leads to a high degree of swelling or opacity of the cornea.

From the investigations of Bullot and Lor it appears that the preservation of the epithelium may be detrimental to the endothelium, which perishes and allows the aqueous to enter the corneal tissue. Removal of the epithelium over half the cornea prevents swelling and haziness of that part whilst the covered half becomes opaque and swollen. This indicates that the epithelium hinders the elimination of fluid, and according to Bullot prevents the passage of an adequate supply of oxygen to the endothelium, which accordingly dies.

From these observations it has been argued that removal of the epithelium over the hazy part of the cornea and repeated tapping of the anterior chamber to let out the pathologically modified aqueous may be of considerable therapeutic value in certain of the diseases observed above.

J. JAMESON EVANS.

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#### SIDLER-HUGUENIN. Ocular Lesions in Hereditary Syphilis. *Beitraege zur Augenheilkunde. Heft li.*

The author records the results of an investigation of the cases of hereditary syphilis culled out of some 120,000 eye cases observed at Zurich. The points specially investigated were the following:—

- (1) The different types of disease of the fundus.
- (2) Are any of these pathognomonic of hereditary syphilis?
- (3) The state of the field, and the light-sense in these cases.

- (4) The prognosis.
- (5) Therapeutics.
- (6) Are lesions of the fundus found in the second generation?

Only those cases which exhibited other signs of lues beyond the lesions of the fundus are included in the statistics.

The paper is thoroughly Teutonic in its elaboration, Some 30 pages of small type are devoted to an abstract of the previous publications on the subject, about 90 pages are taken up with a detailed account of the 125 cases observed by the author, and another 100 pages are assigned to an analysis of the cases and critical remarks on various points.

Sidler-Huguenin groups the changes observed in the fundus into four types. (1) Fine yellowish red speckling with punctiform pigmentation; (2) large patches of disease with the pigmented patches more numerous than the non-pigmented areas; (3) same as No. 2 with the non-pigmented patches in excess; (4) appearances simulating retinitis pigmentosa. This last type is not so frequent. In it the changes are as marked at the posterior pole as elsewhere, while in the other three the lesions are most marked in the periphery.

Besides these four types mixed cases are observed, and other conditions which the author regards as atypical, viz., neuritis, optic atrophy, retinal hæmorrhages and disease of the blood-vessels.

Interstitial keratitis occurred in many of the cases; in some before the fundus lesions were detected, and in others subsequently.

In the cases of type 1 keratitis was primary in 8 eyes, secondary in 7, and as yet absent in 21. Type 2, keratitis was primary in 47 eyes, and secondary in 3. It was present in all cases. Type 3, keratitis was primary in 17 eyes, secondary in 2, and but one eye failed to have keratitis. Type 4, 5 eyes had primary keratitis, 6 had it secondarily, and 13 so far remain unaffected. Of the mixed forms all had primary keratitis. Of the atypical forms 1 had primary keratitis, and 5 were unaffected.

The author has not been able to observe any eye lesions in the second generation. Seven children born of four women with hereditary lues presented no ocular lesions, although the mother of one of the children suffered from severe keratitis interstitialis during the sixth month of pregnancy. All the seven children were rachitic. In all, 19 children of hereditary syphilitic parents are included in the statistics and none of them showed any signs of ocular syphilis.

In the 125 cases keratitis occurred in 74, Hutchinson's teeth were present in 55, and deafness in 29. Rachitis was seen in 41 patients. In the matter of treatment Sidler-Huguenin finds anti-syphilitic remedies less effective than general constitutional treatment.

In two cases the interesting observation was made that the children of a second marriage were perfectly healthy, though the offspring of the first marriage were syphilitic. In both instances the first husband was syphilitic, and the children affected. The wife married again a healthy man, and bore to him healthy children.

The vast amount of details in the paper render any abstract of its contents unsatisfactory, and for further information our readers are referred to the original.

J. B. S.

NICOLAI (Nimeguen). A New Muscle of the Eye (musculus papillæ opticæ). *Annales d'Oculistique*, November, 1902.

Nicolai found that when a puncture of the anterior chamber of a frog was made immediately after death the optic papilla became pushed forwards (into the vitreous). He thought that this was brought about by the choroid, principally by the part adjoining the retina, the lamina basalis, and that most probably contraction of some elastic or muscular ring must occur when tension in the vitreous is suddenly diminished. This, and other considerations mentioned in his paper, suggested the idea that a muscle might be found in the head of the optic nerve. The

elements which the author has described as a muscle are, as a matter of fact, found in large quantities in the head of the nerve. He believes that they are non-striped muscle fibres, because of their form and their behaviour to certain reagents. He has been unable to test their contractility and whether they are doubly refracting. This muscle was found also in man, and in monkeys, cats, pigs, camels, and Iceland ponies.

The muscle is described as consisting of three parts, which are, however, directly connected.

(1) A circular portion surrounding the optic nerve at its narrowest part, at the prolongation of the lamina vitrea of the choroid and of the pigment layer of the retina. Its fibres are placed vertically to the axis of the optic nerve.

(2) A longitudinal part also surrounding the optic nerve, but with fibres having the same direction as those of the optic nerve. Its fibres unite the choroid to the external part of the optic nerve. This muscle is identical with the so-called intermediate tissue of Kuhnt.

(3) A radial part with fibres passing from the periphery to the centre of the optic nerve. This is the most developed part of the muscle. It extends from the lamina cribrosa to the point where the central artery divides. The fibres pass from the periphery to the centre, where they are attached to the canal formed by connective tissue which surrounds the blood-vessels. Between the periphery and the centre are a number of small partitions which communicate with one another in such a way that a species of sieve is formed, through the openings of which the optic nerve fibres pass to the retina. The muscular bundles are found between the bands of connective tissue which form the lamina cribrosa. The part of the muscle situated nearest to the vitreous is peripherally in direct connection with the circular and longitudinal bundles. More posteriorly the bundles arise in the tissue of the choroid and the neighbouring part of the sclerotic.

C. H. U.

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C. A. VEASEY (Philadelphia). Syphilitic Optic Neuritis. *American Journal of the Medical Sciences*, June, 1902.

It has been gravely doubted, and even denied by some of the best observers, that optic neuritis is an early sign in syphilis apart from brain disease, that is to say, exists as a definite lesion. On the other hand, several writers have recorded instances of its occurrence, notably Horstmann, who states that he has seen no fewer than eight cases. Veasey, in a very brief paper on the subject, reports the following singular coincidence.

A Mr. X, aged 45, had noticed his vision to be failing in both eyes, but more especially the left, for the last fortnight or more before consulting the author, and at the same time he had suffered from an aching pain behind the eyeballs. Vision in the right eye was  $\frac{6}{9}$ ; in the left  $\frac{1}{100}$ . Ophthalmoscopy showed papillitis with little invasion of the neighbouring retina, no hæmorrhages, and only slight exudation; the changes in the right disc were scarcely visible. He had acquired syphilis three months previously, and was at the moment under treatment (mercury) for mucous patches, &c. The field of vision was unquestionably restricted in each eye, and there was no central scotoma. Horstmann has pointed out that this is generally the case, which helps to negative any idea that the neuritis may be "descending" in its character. The patient was placed upon more energetic mercurial and iodide treatment, and in two months the vision had risen to  $\frac{6}{5}$  (R. E.) and  $\frac{6}{7\frac{1}{2}}$  (L. F.), and the fields had extended to their normal limits.

Mrs. X, the wife of the patient, was brought thirteen days after her husband's examination. She also had left-sided papillitis; she was also at the time under treatment for syphilitic manifestations—mucous patches and a skin eruption—though her husband's infection was of only three and a half months' duration. In her case also under more vigorous anti-syphilitic treatment vision rose to normal and the neuritis subsided. The infection in each

of these cases was so recent as practically to exclude brain disease: Veasey suggests that the neuritis may have had its origin in disease of the central vessels.

W. G. S.

**E. JAVAL (Paris).** Suggestions for the Help of those who become Blind in Adult Life.  
*Report of the Société française d'Ophthalmologie, 1902.*

The author of this interesting and pathetic article became blind two years ago. Thereupon, with characteristic energy, he set himself a new task—to study the means by which the disabilities attending the onset of blindness in adult life may be lessened or overcome. He now writes for the benefit of others, and begs that readers who have experience bearing on the subject will further his aims by communicating with him. A larger work is to follow in due course.

Well-known examples prove that persons who become blind, even in adult life, are not necessarily incapacitated thereby for useful activity: Huber, blind at the age of seventeen, continued, with the help of a faithful servant, his classical study of the habits of bees; Augustin Thierry, blind at thirty, continued his historical researches and published the results; Fawcett, blind at twenty-five, aided by his wife, exchanged the legal profession for that of an author, became a Member of Parliament, and ultimately Post-Master-General; Milton, losing his sight at fifty, wrote "Paradise Lost" by the hand of his daughter. "Yet," says Javal, "little has been written to aid those who find themselves in this calamitous condition, for the friends of the blind have aimed chiefly at the education of the young and the support of the indigent." Remembering that to some fellow-sufferers his suggestions will be in part impracticable by reason of expense, he addresses himself not to the blind, but to those who care for them, and reminds these latter that things which are unattainable need not be mentioned. To his brother oculists he says: Do not, through false ideas of humanity, encourage hope of possible recovery where there is no hope—as by use of strychnine, electricity, &c.—but rather urge the patient to use the little sight which still remains to him in preparing for the total loss which is to come. The subject is dealt with under various headings. Here we can only give the substance in very condensed form.

*Dependence and Liberty.*—The chief burden of the blind man is

his dependence upon others. For example, in the matter of written correspondence, he may learn to write a letter and to send it without supervision to the person for whom alone it is intended, but he cannot easily obtain an answer privately. One ingenious person overcame the difficulty as follows: He directed his correspondent to address the reply *poste restante*, called for the letter at the post office himself, took a cab to a distant restaurant, and there requested a waiter to whom he was unknown to read it to him.

Javal himself has on occasion instructed a correspondent to write a reply, very legibly, in a foreign language, in German for example, but not in German character. The reply can then be read to him with a little trouble by any Frenchman, the only requirement being that the reader shall understand no German. Where the Braille type is understood, the difficulty of confidential correspondence of course disappears.

For some purposes paid help is better than unpaid. A hired reader will read and re-read that which we wish to hear, omit that which we wish omitted, and spare us his comments. When we dictate a letter he does not interrupt us with advice. Yet, being indispensable, he may grow from a docile aid into an irresistible tyrant. A certain blind man without family became the slave of his reader and his cook, and enjoyed in the end only the shred of independence which was secured to him by the mutual hatred of these two women. The devoted relatives of a blind man may, on the other hand, be too devoted; their constant aim should be to secure his liberty and independence by teaching him to do for himself all that is possible.

*Vicarious Use of Other Senses.*—It is not true, says Javal, that the loss of one sense leads to further development of others. Practice does not enable the blind man to hear the tick of a watch at a greater distance than before he lost his sight. What he can do is to learn to notice sensory impressions which commonly escape the seeing person, and to interpret them with greater skill. "I now always take the hand of a newcomer before offering a chair; it is gloved or ungloved; the feel of the hand, together with the character of the voice and the height from which it comes, often tells me the sex, the height, and in some measure the age and the social condition of the visitor."

Hearing is the blind man's chief informant as to what goes on around him. Useless sounds should be excluded. Thus, a window open to the street may prevent his hearing footsteps in the house, the strike of a clock, the rustle of a skirt, the entrance or exit of a friend. Judgment of the direction in which a sound

comes depends on perception of the difference between the impressions received by the two ears. It may be improved by exercise, and for practice of this faculty frequent visits to the theatre are excellent, as also for learning to note the peculiarities of different voices. Amid general conversation the blind man is lost unless he learns to recognise persons by the sound of their voices, and being unable to see facial expression or gesture, he must give the greater attention to those shades of intonation which reveal the feeling of the speaker. He must become a master in the art of listening.

The sense of smell will sometimes give useful information, but there is no evidence to show that methodical exercise improves it. Those who would use it to full advantage must abstain from smoking and snuff-taking.

The sense of touch is of paramount importance to the blind. Its value, though not its acuteness, increases with practice. The reason that an ordinary man is unable at first to decipher the Braille type is not that his finger is less sensitive than that of the blind expert, but that he has not learned how to use it. The raised points are distinguished not by stationary pressure but by their friction against the moving finger, and for keen perception the movement must be neither too slow nor too fast, the pressure neither too heavy nor too light. The Braille reader should begin, says Javal, with works which he already knows, or which have been previously read to him. By so doing he will cover more ground and gain more practice in a given time.

A stick, or better a light cane, serves to extend the sense of touch; it is the antenna of the blind. It should be at hand constantly, not only when walking abroad. A cord about twenty centimetres long, attached at the same distance from the knob of the cane, serves, by means of a hook or button, to suspend it from a buttonhole of the coat; it is thus at the disposal of either hand and need only be detached for walking. Indoors it is often serviceable; out of doors, held in front with its point moving to and fro just above the ground, it tells the bearer of obstacles in his path, and acts as a warning to others that he is blind. A whistle carried in the pocket is useful for communication with friends or servants where no bell is at hand, as in the garden or the country.

*The sense of obstacles* is the name given to a remarkable faculty possessed by certain blind people. There are blind children who can walk, and even run, not only in their own playgrounds, but in unfamiliar places, without coming in contact with the trees. Walking in a passage, they know whether a door which faces them is open or shut. Passing a house-front, they can even, it is said, count the open windows of the ground floor. This remarkable



sensibility is usually referred, by those who have it, to the forehead and temples, never to the hands. Some refer it to air pressure, but this does not agree with the fact that the perception appears to be keenest when the approach is slow. No doubt it may depend partly on hearing, but in some cases it is not impaired by noise. It is said to be keener, in some individuals, after a rainstorm ; in some it is lost when snow is on the ground. In a case cited at length, that of Professor G——, blind from about the age of four, and a first-rate observer, this sense of obstacles appeared to become most acute in absolute darkness, and to fail almost entirely in presence of a noise. It was modified by the mass of the obstacle, a sheet of paper not giving the same effect as a thick book of the same size. In all cases where this faculty is present it is liable to error, the person sometimes believing that he perceives an obstacle where none exists. The nature of the faculty requires further investigation. We know that hearing, and probably taste and smell, depend upon contact with a ponderable substance ; that sight is different, inasmuch as light impulses can traverse a vacuum ; and that parts of the spectrum, the ultra-violet and ultra-red rays, though invisible to the eye, have certain effects upon the skin ; heat-rays are perceived by the skin without contact of heated matter, as when the rays of the sun or the heat of a fire reach us through a cold atmosphere. Has the influence in question something in common with these invisible rays ? By learning the nature of the faculty we might learn means for developing it. At present it seems to be enjoyed only by persons blind from early life.

*The Habitation.*—Franklin's motto, "A place for everything and everything in its place," concerns the blind above all others. I have had occasion, says Javal, to advise a patient threatened with blindness to acquire the ownership of the house in which he lives. Removal under such circumstances is a real calamity. Books, papers, and even articles of furniture, should remain and be scrupulously kept where he has been accustomed to see them. Soon he will move about among them and place his hand on anything he wants without assistance. Some say that in a blind man's house every door should be either closed or widely open. The advice is bad. However careful the family, a stranger may any day leave a door ajar and a bruise of the forehead will follow. A better safeguard is the habitual use of the stick or cane, as already mentioned. In large houses special strips of carpet or linoleum may be so placed as to form useful tracks and landmarks, but this will be seldom necessary. The difficulty is greater out of doors, and in the garden there should certainly be a well-made path on which he may promenade with safety, guided only by the feeling of his feet, while his fingers are used for his book.

*Watches and Clocks.*—A methodical man will secure to himself, in spite of his blindness, the means of telling the time at any moment ; unable to perceive his position in space, he will the more desire to know it in time. There are inexpensive watches suitable for the purpose ; the metal case opens on pressure, there is no glass, the positions of the figures on the dial are indicated by small pegs ; by feeling these and the hands of the watch, one can tell the time almost to a minute. The thumb should be used rather than the finger, so that the sensitiveness of the latter, so precious for reading, may not be blunted. A repeating watch is a pleasant companion and to such a watch dial pegs may be added. In the night it is better to touch the button of a repeating watch or clock than to feel the dial ; it is less trouble and one falls asleep again more easily. In the day room a clock which chimes the quarters is a luxury. By the following method even the ordinary (keyless) watch can be made to tell the time in the dark : wind the watch precisely at the time at which you wound it last night, and in doing so count the “clicks,” divide the number by twenty-four and you have so many clicks to the hour and so many minutes to each click : waking in the night and wishing to know the time, rewind the watch slowly and count the clicks. Supposing that each click corresponds to ten minutes and that it now takes twelve clicks to wind the watch fully, it is just 120 minutes, or two hours since you wound it up.

*Walking abroad* should not be abandoned, but for one who loses his sight late in life a guide will be necessary. Thus assisted he may, if the guide be skilful, walk without fear while conversing easily, even in populous places. The guide must give his arm to his charge and be thus slightly in advance of him. When he wishes him to raise a foot, as in stepping from the roadway on to the pavement, he raises his forearm sharply ; when to step down he presses it to his side, as though to prevent him from falling. When he desires to protect him from someone coming towards him he steps a little in advance and in front of him, whereupon his charge, perceiving the movement, falls a little behind. There should be no attempt to conceal the infirmity ; to indulge one's self-esteem in that way is to lessen one's security. The constant wearing of dark glasses is useful, not only as hiding any disfigurement of the eyes, but as an intimation to others ; no one will take it amiss in such a case if the guide facilitates the movement of his charge by signs or requests. Where several persons undertake to act as guides at different times they should as far as possible adopt the same system ; their charge, on the other hand, must not look for perfect uniformity in this respect. In narrow places, in

the woods and fields, and especially on the mountain side, a stick held horizontally between the two is better than the hand in the arm ; but here, as elsewhere, the blind man should carry his cane in the other hand. In open ways where there are few people there need be no holding, the slightest touch will suffice. In mounting the staircase a hand upon the rail is better than the arm of the guide. Instances might be given of blind men accustomed to walk freely and far without a guide, but such men have usually been blind from childhood. Some have found it easier to walk by night than by day, because noises are less numerous and confusing. One always carried a lamp so as to avoid collision with cyclists. He who trusts himself alone in a hired vehicle will find it prudent to ascertain the driver's number.

*Gymnastics and Cycling.*—Many gymnastic exercises—parallel bars, trapeze, &c.—can be practised by the blind, and in certain blind schools they are developed to an astonishing extent. Those who cannot conveniently attend a gymnasium, or who object to publicity, should use dumb-bells, &c., at home. Such exercise is more needed by the blind than by the seeing ; the latter, even though their occupation be sedentary, make frequent movements—rise to fetch things, turn the head in speaking to others, stoop to pick up things which fall ; the former, though occupied, are relatively still.

Better than chamber exercise, however, especially for an energetic person, and better even than walking, is the tandem tricycle. With a trustworthy companion in front, he gets exhilarating exercise and is free from the preoccupation which hinders him in walking. He quickly learns to adapt his pedalling to that of his companion, and even to back-pedal instantly when warned by the horn or brake. If he dislikes publicity he may ride at night. The blind rider will not find it tedious, as others do, to ride frequently over the same route ; he will find interest in learning to recognise the various points by the slopes and turns of the road, the character of the pavement, and the sound of the traffic. The sense of danger naturally felt on first trusting himself absolutely to his companion in a crowded street will disappear ; the risk is hardly greater than that of riding in a cab, where at any time he may be at the mercy of a vicious horse or a drunken driver.

"After nearly two years of practice," says Javal, "I can say that the tricycle has served me better than I hoped." The practice is not entirely new. The tandem tricycle is used by several blind persons in France. At the Norwood Institution there is a kind of cycle train of nine seats, of which the first and last only are occupied by seeing persons.

*Travelling.*—Many blind persons travel alone for pleasure or for livelihood. At each Annual Congress of Directors of Institutions for the Blind may be seen members who have travelled alone from different parts of Europe. At railway stations the necessary help may be secured by writing beforehand to the station master for a commissionaire. At hotels, a sufficient gratuity given on arrival to one or more of the attendants will ensure all needful service. Certain hotels provide specially for travellers of this kind. "But," adds Javal, "I have not yet heard of a single person blinded late in life who has disregarded the fears of his relatives so far as to travel alone."

*Meal-times and Social Intercourse.*—The pleasantest moments of the blind man's life are those which he spends at table in congenial company. Here he can take part in general conversation almost as well as a seeing person. Having once ascertained where each one sits, he is not disturbed and confused, as at other times, by the unperceived comings and goings of those with whom he talks.

But if he would feel free to dine in society he must learn to take food neatly and without too much help. Here are some useful hints—though the first may be less acceptable in England than in France: He should protect his coat with the table napkin, and in order that this may not slip down unobserved, he should make a small knot at one corner and push this between his neck and the collar of his shirt, whereby it will be firmly held. In taking soup—the chief difficulty—let him tilt the spoon a little each time before he raises it to his mouth; it cannot then be overfull and there need be no spilling. Acts which are impossible, such as putting mustard properly on meat, or squeezing lemon-juice on an oyster, should not be attempted. In pouring wine or water into a glass he may manage, by placing a finger of the left hand within the rim of the glass, to help himself, but in such matters it is usually better to accept the willing help of a neighbour, even though not necessary, than to decline it. Best of all is a servant, who knows his needs, behind his chair.

When not at table the blind man can converse only with those who seek him out, and may find himself restricted to his own family and to the small number of true friends who make a point of visiting him. This indeed is much; for the heart it is sufficient; but for the mind it is monotonous. His guardians should make it their duty to take him into society and to bring to him those who might not come spontaneously, little thinking of the happiness which such intercourse can give to one so isolated. The friend who speaks to a blind man should always begin by

saying who he is ; before he moves away from him he should say that he is about to do so, thereby saving him the miserable experience of finding himself talking to empty space ; if he speaks to him again later he should not fail to introduce himself again. The sufferer, on the other hand, may sometimes guard himself by getting the friend to sit by him on a sofa, and by taking between his fingers, unperceived, a fold of the coat or skirt, so that there can be no unknown departure.

*Reading aloud* is a great boon to the blind, but no easy task to the reader. To skim the daily paper with one's own eyes occupies no great amount of time, for that which does not interest can be left unread ; to read it through is a matter of many hours. The ideal plan is that a person who knows the tastes and interests of the sufferer should first glance through the paper, marking the matters of interest, and then more deliberately read these passages to him. For reasons already suggested, a hired reader is in some respects to be preferred to a friend or relative. In reading aloud few persons give sufficient value to the punctuation, and some training in this matter will well repay the trouble. A considerable pause should be made at the end of each sentence. The auditor will thereby better retain what he has heard, and the reader will gain not only a desirable rest, but some foreknowledge of the following sentence, and will read it better in consequence. He must learn also that he is not at liberty to pass without remark such things as inverted commas, the headings of chapters, and the numbering of paragraphs. "During holidays I have got my grandchildren to read plays to me, the characters being suitably distributed among them. They have thus acquired the useful art of reading aloud, and will, I think, be glad to remember the pleasure which they have given to their grandfather. This armchair-theatre has afforded me a choice recreation."

*Writing*.—Those blind from infancy cannot learn to write in the ordinary way, but those who go blind after they have acquired the faculty should not permit themselves to lose it. The accustomed movements of the fingers are easily retained. The chief difficulty lies in writing line after line in correct position. A well-known plan is to fold the sheet of paper in such fashion that it presents only so much of its surface as is required for one line of writing, and to fold it to a similar extent for each successive line. The method, however, is troublesome when one has much to write. In the writing-board invented by Javal, the elbow lies in a metal pocket, and thus becomes a fixed point round which the hand moves in short parallel arcs of a circle. The position of the paper is regulated by a series of notches, by means of which the writer,

having finished one line, can move the paper into the proper position for the next. He uses a stylographic pen, and most ingeniously employs a rolled strip of tissue paper to tell whether the ink is flowing properly. At the end of each line the pen is drawn across the end of the paper ribbon; when the ink flows properly the paper is wetted and tears with the slightest pull; when it fails the paper remains dry and does not tear.<sup>1</sup>

To those who prefer blacklead to ink, the Koh-i-noor pencil made by L. C. Hardmuth is recommended. It is both black and very hard.

*Typewriting and the Phonograph.*—Bad writers, especially if still young, should learn to use a typewriter; if they already know the Braille letters, they will learn more easily by gumming these on the keys of the machine. A machine to print Braille and ordinary letters simultaneously, the one above the other on the same paper, should be made, if it does not already exist. Using such a machine, the blind man could read his letter when written and send it to a seeing friend: the latter, though ignorant of Braille, could read it, and with a similar machine could write a reply intelligible to his blind correspondent.

The phonograph is the quickest means of recording thought. In business houses letters are dictated to this instrument and thence transcribed at leisure by the typist. A business man or author who loses his sight may use the phonograph in this way. "For my part," says Javal, "I am glad to commit to the phonograph the outline of a projected work, and to make it repeat this to me, section by section, as it is elaborated."

*Braille Reading and Writing.*—For hours of solitude Braille reading is a welcome resource. All should learn it. But to those who have been accustomed to read in the ordinary way, its drawbacks are far more apparent than to the blind from infancy. Few learn to read aloud fast enough to give pleasure, *i.e.*, attain to one hundred words a minute. Javal finds himself able, where the impression is good and the style simple, to read fifteen to twenty. Braille writing is slower still. An expert accomplishes at most 10 words a minute; Javal about 4; "whereas, with my writing-board, I can, in spite of my blindness, write 25." An expert seeing writer can easily accomplish somewhat more than this. Braille shorthand effects for the expert writer a saving in paper

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<sup>1</sup> This apparatus may be found figured and described in the OPTHALMIC REVIEW for September, 1901. It is made by Giroux, 19, Rue de l'Odéon, Paris.

of about one-third, and in time of perhaps one-fourth; for the reader there is no saving. With the Six-keyed American machine Braille can be written at least three times as quickly as with the stylus. Away from home the Braille method is useful for making short notes or memoranda. It is also valuable for endorsing such papers as one may wish to be able to recognise by touch. Directions for learning Braille are to be found in many manuals and are therefore not given here.

The speed attainable by different methods of expressing thought is about as follows, but no claim is made that the figures have a precise value: A good reader, omitting nothing, can read to himself at the rate of 400 to 500 words a minute. The most deliberate speaker delivers more than 100 words a minute, the most rapid rarely more than 200; a good average is 160.

A skilled typist writes easily and for hours at the rate of 40 words; the record in 1900 was 67. A perfectly legible pen writing reaches about 20 words, that is, half the speed of the typewriter; a rapid writer reaches 35; Javal, with his writing-board, 25.

Telegraphists, by the Morse method, send 25 words of 5 letters per minute—the speed of ordinary writing. The receiving clerk, reading the message by ear, can therefore write it out as it comes.

Braille writing is the slowest of all. Javal's speed is 4 words a minute. A blind expert reaches 8 words, and with the aid of shorthand 10. The Braille reader is at still greater disadvantage, as compared with the seeing. Javal attains 20 words; many of the born blind reach 60, a few even 100 or 120.

M. de Ménéux, a blind librarian, can actually read nearly 200 words a minute. He is 27 years of age and blind from birth. At the moment when his right index finger reaches the end of one line, the left has already traversed one-half of the following line, so that the mental reading by the one follows that by the other and the vocal reading comes a little later still.

The preceding figures refer to the French language. In all particulars the speed for English is probably greater. On the whole it may be said that the speed of reading and writing attainable by the born blind is about one fourth of that accomplished by educated seeing persons. For those who learn Braille late in life the difference will be found far greater.

*Maps, Plans, and Sketches.*—Relief maps are employed in blind schools for teaching geography. Charts, &c., may be made by embroidery on canvas or perforated card. But these, in so far as they are obtainable ready made, are of limited and definite kinds only; for new or special purposes, something more is wanted,

Javal has ingeniously made use of sheets of wax measuring 20 by 30 centimetres and having a thickness of 1 millimetre or rather more. Lead wires of various thicknesses, from 1 to 2 millimetres, laid on such a sheet in any required direction and lightly pressed into it afford a good relief map. The wax sheet is laid on any map or figure which it is desired to reproduce, and being transparent permits the latter to be seen and reproduced in wire without difficulty. To differentiate the lines, other kinds of wire, such as the spiral string of the guitar, may be used, and such things as shot, fragments of wood, wax, &c., may be used to mark particular points. The wax sheets are flexible, but can be preserved on wooden boards. Javal adds that a different method, unknown to him at the time, namely, the employment of cotton threads covered with wax, is employed at Nuremburg, and for some purposes is better than his sheets of wax.

*Games.*—With a good memory a blind man may play dominoes, chess, draughts, and cards. The greatest chess players have played blindfold. Play is accomplished more easily on boards perforated for the reception of the pieces; such boards are made for playing in the railway train. Playing cards recognisable by touch may be obtained, as also a small instrument for making the necessary needle pricks in ordinary cards.

*Tobacco.*—It is sometimes said that the blind, being unable to see the smoke, get no enjoyment from tobacco. This is a mistake, at least as regards those who were regular smokers before they lost their sight. The blind smoker will perhaps, more often than another, continue to draw at a pipe or cigar when it has gone out. "If I suspect that my cigar is out I surround it, so to speak, with my hand without touching it; if it is burning the heat is easily felt." By means of an ash tray here and there about his room, or elsewhere by means of a small flask such as consumptives carry, the blind smoker may rid himself of ashes or cigar ends without inconvenience to others, wherever he may be. Very dry cigars are the best, for they can be smoked slowly and do not easily go out. "In presence of a stranger, when I do not wish to consult my watch, I often measure time by means of my cigar."

In conclusion we again draw attention to Dr. Javal's request that those who have useful experience of the kind in question will communicate with him. His address is: 5, Boulevard Latour-Maubourg, Paris.

P. S.



## CLINICAL NOTES.

AN EXPLANATION OF THE CAUSE OF INEQUALITY OF PUPILS IN CASES OF THORACIC ANEURYSM.—This question has been studied by R. C. B. Wall and E. W. W. Walker, whose conclusion is that the pupillary inequality observed in thoracic aneurysm is usually due to inequality of the blood pressure in the ophthalmic arteries, resulting from abnormal vascular conditions. A general summary of their line of argument is as follows: *A.*—The explanation which ascribes the anisocoria at times occurring in cases of thoracic aneurysm to interference with the sympathetic is unsatisfactory. (1) On anatomical grounds: (*a*) because in the majority of cases there is no evidence of implication of that portion of the sympathetic nerve trunk containing pupil dilator fibres; and (*b*) because it is not established that sympathetic filaments supply the sac wall of an aneurysm. (2) On physiological grounds: (*a*) because the explanation supposes that the same conditions may produce sometimes irritation and sometimes paralysis of the nerve; (*b*) because cases are rare in which there is any evidence apart from the pupillary change that the sympathetic is involved; and (*c*) because the pupillary changes are not those met with in cases where the sympathetic is involved. *B.*—(1) Alterations in vascular conditions may be associated with alterations in the size of the pupils. (*a*) High arterial tension is associated with small pupils; and (*b*) low arterial tension is associated with large pupils. (2) The physical explanation of this phenomenon is probably to be found in the spiral structure of the vessels of the iris. *C.*—Local inequalities of blood pressure may therefore be associated with inequalities of the pupils. (*a*) Clinical evidence: (1) Enlargement of pupils is frequently associated with diminution of the temporal and radial pulses on the same side of the body. (2) Obstruction of the carotid artery on one side of the neck is associated with enlargement of the pupil upon the same side. (*b*) Experimental evidence: (1) Obstruction of the carotid in rabbits is associated with enlargement of

the pupils on both sides, owing to the freedom of circulation at the base of the brain. (2) Injection of water into a carotid artery of a dead rabbit causes narrowing of the pupil upon the same side. (3) Digital compression of the carotid artery in the human subject is associated with enlargement of the pupil upon the same side.—*Lancet*, July, 1902.

CARCINOMA OF THE EYE TREATED WITH RÖNTGEN RAYS.—The interest of the particular case to which Pusey refers in this article is that apparently, as has occurred under other circumstances also, the influence of the X-rays persisted long after the patient had ceased to be exposed to them. The patient was a man aged 70, who came with one eye destroyed and the whole orbit filled with a cancerous mass; microscopic examination of an excised portion confirmed the diagnosis of carcinoma. Treatment with X-rays was the only means of attack which could well be employed, and the condition of affairs was so bad that not much hope of improvement could be held out. During the first month of this treatment the pain abated considerably and the tumour became smaller, but later excruciating headache came on and it was not doubted that this was due to intracranial extension of the disease, more especially as even on the surface, where the rays were caused to impinge, the growth was again rapidly increasing. Under these circumstances the treatment was suspended and the patient sent home—practically speaking, was sent home to die; but about five months after the last application of the X-rays, and having had no treatment whatever in the meantime save narcotics, he reappeared with the mass in the orbit quite shrunken, allowing the lids to close over it, eating and sleeping well, and using no anodyne. Except for the presence of a few nodules on the nose near the commissure, he looked very well. Apparently the action set up by the rays had proceeded even after their cessation, and the patient had, one might say, recovered from what could not but be regarded as a perfectly hopeless condition. The case may serve to

encourage more prolonged use of the rays than is usual, and their employment when all else seems of no avail.—*Journal of American Medical Association*, August 30, 1902.

**SUTURING TENDONS IN ENUCLEATION.**—F. C. Todd does this, including the four recti tendons, in a single purse-string or tobacco-pouch suture. After dissecting up the conjunctiva, a tendon is raised on the strabismus hook, and a suture passed through conjunctiva and tendon from without inward and out again. The next tendon in order is caught up in the same way and similarly transfixed. When all have been thus treated the enucleation is completed, and the suture drawn upon and tied. Snell's method is somewhat different from this, and also from that of de Schweinitz: after division of the conjunctiva he lays hold of each tendon by a stitch passed through it (twice) across its breadth and knotted lightly; one end of this stitch is cut short, the other is passed from within outwards through conjunctiva and left long. At division of the tendons care has to be taken that this stitch is not snipped through, and after the enucleation the outer and inner muscles are brought into apposition by tying together their threads; the upper and lower are then similarly united. The resulting wound is horizontal, and may be still further closed by a couple of stitches at its two extremities.—*Ophthalmic Record*, May, 1902; *British Medical Journal*, 1902, ii., 1430.

**CONGENITAL OPHTHALMOPLÉGIA.**—In the case reported by Péchin there is just a slight element of doubt that perhaps the condition may not have been strictly congenital, for no complaint was made till the boy began to earn his living as a carpenter. He was first seen by Péchin when aged 20; there was incomplete ptosis of each eye, rather more pronounced on the left side. In order to enable him to see on the level of the eyes the head had to be thrown slightly back. Neither in a vertical nor a lateral direction could the eyes be moved through more than 1 mm.; they were quite fixed in a parallel direction. At the same time accommodation and the pupils reacted correctly. On correction of his myopia vision was perfect. There was, of course, no diplopia;

there was no exophthalmos, and the fields of vision were complete. It is important to note that the facial nerves were also involved, for though the cheeks were not completely immovable, there was an evident paresis of their muscles. The occipito-frontalis contracted fairly well, but its action was curiously evanescent; it could not be kept up for more than a very few seconds. In all other respects the patient was quite healthy and well developed. There had been no illness in infancy or childhood to which the occurrence could be traced, and the conclusion had been come to that it was truly congenital. During several years in which the young man had been kept under observation there had been no alteration.—*Revue générale d'Ophthalmologie*, xi., 1902.

**OILY COLLYRIA.**—In giving his experience in the use of "*Les Collyres huileux*," Terson very strongly advocates the employment of eserine in solution in oil. He recommends a 1 per cent. solution in olive or arachis oil, prepared by dissolving the alkaloid in ether, adding this to the sterilised oil and heating the mixture in a water bath sufficiently to evaporate the ether. In order to obtain the best results the collyrium must be carefully and accurately prepared. Terson claims that this oily solution of eserine has many advantages over a watery preparation: it does not become discoloured, it retains an aseptic condition "indefinitely," and in spite of the rather high dosage it is better tolerated and less painful in its application than an aqueous solution. Although he considers that the other alkaloids commonly applied to the eyes, *e.g.*, atropine, cocaine, &c., may be advantageously used in oily solution, the writer does not think their action in oil better than that in water; but in reference to eserine his experience allows him to have no doubt of the great superiority of the solution in oil over that in water.

Terson draws attention to the fact that as long ago as 1850 Deval recommended the use of olive oil as a solvent for acetate of lead when applied to the eye, and stated that the oily solution was less painful and more effective than an aqueous solution.—*Bulletin des Sciences Pharmacologiques*, December, 1902.

## AN OPERATION TO ENLARGE A CONTRACTED SOCKET, SO THAT IT MAY HOLD A GLASS EYE.

BY PATRICK W. MAXWELL, M.D., F.R.C.S.I. (Dublin).

IN vol. xii. of this Review, p. 189, I described an operation to enlarge a contracted socket (fig. 1). The operation has been performed by my colleagues, Mr. Swanzy and Mr. Benson, as well as by myself, on about eight or nine patients, all of whom, so far as we know, have been able permanently to wear a glass eye. In one patient whom I saw eight years after operation no subsequent shrinking had occurred.

There were, however, certain disadvantages connected with the operation :—

(1) The bottom of the new sulcus was held down by a suture whose ends emerged on the cheek. The threads usually cut the skin and left two little marks.

(2) The rotation of the skin bridge made a pucker at each end which never entirely flattened down.

(3) The fixation of the ends of the bridge allowed the formation of a proper socket only in the middle. This, as a rule, made it necessary to order specially a more or less D-shaped glass eye, which was apt to turn round.

I have lately treated four additional patients with most gratifying results by the following modified operation (fig. 2). An incision is made in the floor of the socket and carried downwards behind the lower lid. A semilunar flap about 8 mm. in width at its widest part is marked out on the skin, its upper con-

cave border being about 5 mm. below the edge of the lower lid. The incision along the upper border of the flap is made to communicate with the bottom of the wound in the socket. The flap is now dissected up

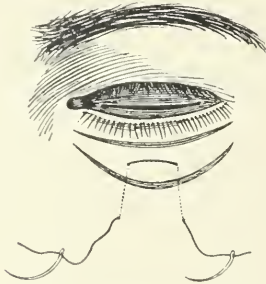


FIG. 1.

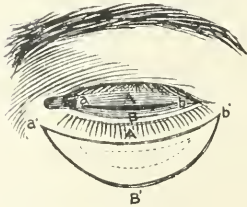


FIG. 2.

from the subcutaneous tissue, except an area represented by the dotted line in the figure. The two ends of the flap (a' and b') are passed through the opening into the socket and sutured to each end of the socket incision (a and b), and the borders A' and B' being

also passed through, are sutured to A and B respectively. The space on the cheek is closed and the operation completed by putting in a temporary glass eye or shell. This should be as nearly as possible of the size and shape as that which is to be ultimately worn. This glass eye prevents the new sulcus from being obliterated by contraction and gives it a suitable shape. It cannot safely be taken out for at least a week, as the skin incision might be opened in so doing. If there be secretion, the space behind can be flushed out by a lachrymal syringe armed with a fine curved nozzle, which can be introduced under the eye at the inner or outer canthus. A glass shell with a hole in front is preferable to a glass eye, because it allows a syringe to be more easily used, and being transparent a view of the parts behind can be obtained.

To get a good result the following points should be attended to :—

(1) Make the incision in the socket as long as the space will permit, and see that this length is maintained throughout its entire depth.

(2) Make the skin flap considerably longer than the incision in the socket.

(3) When dissecting up the skin flap, leave undisturbed a portion (dotted line in figure) equal in length to the socket incision. This ultimately forms the fornix or sulcus. If a shorter portion is left the sulcus is apt to become V-shaped, which would require a specially made glass eye.

(4) When closing the space on the cheek, as the lower border is longer than the upper, great care should be taken to equably distribute the excess, so as to avoid puckering. When this has been neatly done the line upon the face becomes quite invisible after a few months.

Should the operation have to be performed on a deeply-sunk orbit, the procedure might be facilitated by a preliminary division of the external canthus.

In none of the cases as yet operated on has it been necessary to make a sulcus above. The same operation could, however, be performed on the upper lid provided that, after dissecting back the upper border of the skin flap, the tendon of the levator was secured with one or two sutures before dividing it. After the skin flap was in its new position the cut end of the levator could be attached to the tarsus. In closing the skin wound the ends of these deep sutures should be allowed to project outwards, so that they could be pulled out when they ultimately become loose. If really aseptic catgut could be obtained, the ends might be cut short and buried.

Besides providing a sulcus, the operation adds half the width of the flap, viz., 4 mm., to the vertical diameter of the socket.

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### REVIEWS.

H. M. BERNARD. *Studies in the Retina. Parts 3, 4, 5. Quarterly Journal of Microscopical Science. New Series. No. 181 (vol. xlvii., part 1).*

In vols. xliii. and xlv. of the same Journal Bernard has published parts 1 and 2 of these studies on the retina. The work has been done in the Biological Laboratories of the Royal College of Science, London; it is entirely of a histological character, must have been pursued with enormous diligence and patience, and leads its author to conclusions as to the structure and function of the retina, which are both novel (one might almost say revolutionary) and fascinating. The report of the work is clear, concise and carefully reasoned, and is illustrated by numerous reproductions of the microscopic sections upon which it is based.

In parts 1 and 2 Bernard claims to have shown that the retina can no longer be considered to be built up of numerous varieties of cells with their processes. He holds that



the functional retina is a continuous cytoplasmic reticulum in which nuclei are suspended, and that the nuclei are not stationary; as long as the retina is functional nuclei stream outwards towards the external limiting membrane from both the inner and middle nuclear layers, with the result that in old retinae the nuclei of these layers, though replaced by migration, are greatly reduced in number. This migration and using up of nuclei in a functional retina shows that some other value must be assigned to its structural elements than that which the neuron theory supplies. Bernard concludes that in primates what are called cones, are, as in the fish, merely rods with their inner limbs distended with refractive material in process of transit through them. The refractive material in the outer limbs of the rods is absorbed pigment, which is usually, but not always, clarified during the process of absorption. The striation of the rods is due to the existence of strands in the walls of the rod vesicles, while the lumina of these vesicles are occupied by a sustaining network in connection with these strands.

In part 3 Bernard finds that in amphibia the migration of nuclei in the growing retina can be actually seen, but it is besides a necessary assumption in order to explain the formation of the large number of new rods required by the growing retina. The retina, as a whole, grows mainly at its edges, thus increasing the size of the optic cup; at the periphery the nuclei are not differentiated into two layers, and not yet being specialised they divide and multiply; these nuclei wander to the more central parts of the retina in the inner nuclear layer and then traverse the outer reticular layer as needed in the outer nuclear layer to facilitate the development of rods; the nuclei in the outer layer being already specialised do not divide, but a few nuclei for rods are possibly derived from the large cells of the ganglionic layer. This streaming of nuclei from the indifferentiated rim of the developing retina lays the foundation of the two reticular layers; the cytoplasmic processes, by which the nuclei, when first formed at the rim, are attached to the internal and external limiting membranes, in the migration

of the nuclei centralwards, are swept to the sides of the stream ; some of the processes forming the external reticular layer are possibly used up in the formation of rod vesicles, but the inner accumulation persists undiminished ; the outer reticular layer is thinner than the inner reticular layer. Borysickiewitz has found evidence that in the human retina nuclei wander from the inner to the outer nuclear layer through the outer reticular layer, thus extending and confirming Bernard's observations, which on this point were mainly made on amphibian retinae. In one of his preparations Borysickiewitz observed a tract of the inner nuclear layer become abruptly reduced from two rows of nuclei to one, and again becoming two ; where this layer consisted of a single row of nuclei he identified the nuclei of the missing row either in, or on the outer side of, the outer reticular layer ; he considers these nuclei to be moving in the more fluid axial portion of Müller's fibres.

In part 4 Bernard deals with the formation of rods, "the essential visual elements." He is of opinion that, in the presence of rod nuclei, they are formed by vesicular extrusions through the external limiting membrane towards the layer of pigment cells. By mutual pressure the vesicles become transformed through various phases of cones and Schwalbe's rods into normal elongated rods. The fully-formed rods appear striated, owing to the axially directed lines of pigment which they have absorbed from the pigment cells ; this pigment they clarify in its passage and transmit into the inner layers of the retina.

Part 5 deals with the removal of the absorbed pigment matter from the rods, and offers an explanation of Müller's fibres. Bernard considers that some of the pigment matter absorbed by the outer limbs of the rods by accumulating in their inner limbs in a modified form helps to constitute the bodies known as "ellipsoids." In the eyes of fish, notably the cod, giant cones are found ; these, Bernard holds, are rods with their inner limbs immensely distended with refractive material derived from the pigment of the pigment layer ; they are not comparable to the cones in amphibia, which he regards as stages in the formation of rods.

The refractive matter is passed out of the distended inner segments of the rods and guided into the inner layers of the retina by its cytoplasmic framework ; this stream, Bernard considers, is what Ramon y Cajal and others designate the "cone fibre ;" the basal expansion of these fibres he explains as due to temporary arrest of the stream of refractive matter as it enters the outer reticular layer.

Further arguing the point, Bernard says that in amphibia the presence of the ellipsoid shows that refractive material is entering the inner segments of the rods ; as their inner limbs do not become distended it is certain that the same material must be constantly passing out of these segments.

In the retina of a South African baboon which had been exposed to great glare of the sun, Bernard was able to observe pigmented refractive material streaming away from the rods through all the retinal layers, and so rapidly that it did not get changed entirely into unpigmented material even in the inner layers.

Müller's fibres, Bernard finds, so far from being sustentacular and formed out of distinct cells with recognisable nuclei, are only streams of absorbed and clarified pigmented matter finding their way through the retina, their development depends on the degree of functional activity of the retina ; there are no Müller's fibres before the eye begins to exert its function ; the streams of refractive material are temporarily arrested by all strands of cytoplasmic material arranged tangentially, and definite streams of it only form along the strands arranged radially. The check given by the internal limiting membrane gives rise to the enlarged base of "Müller's fibres." Does the refractive material pass through this membrane ? In answer to this question Bernard points out that it has already passed the barrier of the similar external limiting membrane and that it does not accumulate on the outer side of the internal limiting membrane ; moreover, in the baboon's eyes above referred to in which the refractive material retained throughout some of the pigment from which it was derived, in sections in which the vitreous was left *in situ*, the layers of vitreous nearest the retina

were found to be coloured like the pigmented matter on the retinal side of the internal limiting membrane.

Bernard concludes by asserting that a proportion at least of the dendrites, and certainly the rod fibres and Müller's fibres, are nothing but the stream of the refractive material. In another paper he hopes to show that the nerve paths through the retina can be demonstrated by ordinary methods of staining, and have no connection whatever with the dendrites.

J. HERBERT FISHER.

H. HUSS (Karlsruhe). On the Effect of Peroxide of Hydrogen on the Eye, and its Employment in Ocular Therapeutics. *Klinische Monatsblätter für Augenheilkunde*, November and December, 1902.

The author deals first with the physical and chemical characters of peroxide of hydrogen ( $H_2O_2$ ), pointing out that the preparations formerly in the market were of most uncertain strength and quite unsuited for medical purposes, the 30 per cent. preparation made by Merck, however, he considers perfectly reliable as a standard solution, and from it any weaker strength is readily obtainable. He describes fully the catalytic action which the blood tissues, &c., exercise on solutions containing  $H_2O_2$ . The intact cornea covered by its epithelium he finds to have no such action, but on the contrary, the corneal substance has this effect when exposed, and strong solutions of 10 per cent. to 30 per cent. of peroxide of hydrogen produced patches of necrosis in the rabbit's cornea. Sub-conjunctival injection of a 2 per cent. solution caused filling of the anterior chamber with bubbles of oxygen which could be seen to rise out of the angle of the chamber. The gas disappeared from the anterior chamber in about three hours. In other cases there was marked loss of transparency of the corneal margin due to infiltration of its substance with fine gas bubbles. A 15 per cent. subconjunctival injection caused

very rapid formation of gas in the anterior chamber with increase of intra-ocular tension, and a few minutes later the animal died in convulsions, the cause of death being gas emboli. (Huss, therefore, warns his readers as to possible dangers from this form of treatment in man.) The aqueous has no catalytic action, and it is not the  $H_2O_2$  which penetrates into the anterior chamber to be there broken up. The oxygen is liberated in the subconjunctival and episcleral tissues, whence it passes into the anterior chamber. Huss attempted to force air and carbonic acid into the anterior chamber by injecting the gases into the subconjunctival tissues under pressure, but was unsuccessful.

Dealing next with the therapeutic value of  $H_2O_2$  Huss discusses first its bactericidal action; this, though powerful enough under certain conditions, appears to be very small in those media which have a marked catalytic action, *e.g.*, blood, pus, &c. Contrary to the experience of some other observers, Huss found that stronger solutions than 1 per cent. to 3 per cent. could not be borne. As a therapeutic agent its value does not appear to be great, for we learn that in most cases of conjunctivitis, and especially in the phlyctenular forms, it was harmful, and also in parenchymatous keratitis. It proved useful, however, in dacryocystitis for syringing out the nasal passages (2 per cent.), also in checking bleeding during certain operations and in cleansing infected wounds. In septic ulcer it seems to have proved of some value as an adjunct to other forms of treatment, *e.g.*, cauterisation. Its action appears to be chiefly a cleansing one, the bubbles of developing gas clearing very effectually the layer of pus and detritus from the ulcerated surface.

J. V. PATERSON.

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- A. TERSON. Spring Catarrh. *Annales d'Oculistique*.  
November, 1902.
- L. DEMICHERI (Monte Video). Spring Catarrh.  
*Archives d'Ophthalmologie*. October, 1902.

The disease in question has now, says Terson, become recognised as a definite entity, though for a time it was looked upon by many surgeons with grave suspicion that it was an old friend putting on a different face. He does not, however, altogether approve of the term by which it is probably best known in this country at any rate, namely spring catarrh, nor of certain other designations which have been given to it, *e.g.*, phlyctæna pallida, circumcorneal hypertrophy, and gelatinous thickening of the limbus; he would prefer to call it recurring vegetative spring catarrh.

Between the bulbar and the tarsal lesions Terson thinks he has observed this relation, that the two are rarely or never well developed in the same eye: if there are copious tarsal vegetations, the conjunctiva of the limbus shows little change, and *vice versa*. This observation is also borne out, though less decisively, by Demicheri's figures. Some have described certain hypertrophies of the nasal mucous membrane along with this condition, but Terson's experience does not show that this is at all frequent; similarly, although it is stated to be more frequent among the inhabitants of low-lying and damp localities, he has seen it also in persons whose surroundings were not of that type. Most observers consider that spring catarrh is a disease of the male sex principally, and is particularly apt to arise between the sixth and the fifteenth year, but it certainly can occur even in very young children, and later in life as well.

Terson holds the view that most (though not all) writers have made too much of the epithelial part of the lesion, to the exclusion of the sub-epithelial element: the initial lesion is not epithelial but underneath. Raymond has proved that while the epithelium is no doubt proliferated, the chief mass of the new formation is not composed of epithelium but of conjunctival tissue proper; and so great is

the proportion of fibrous tissue in some cases that Schlub proposed to call the mass a fibroma. Terson draws attention further to the want of similarity of aspect even between the vegetations in the limbus and on the lid surface; in the limbus the epithelium is thickened, stains deeply and is stratified; he could, at least in certain cases, find no distinct basal membrane such as is insisted upon by some writers; the underlying tissue, which contained dilated blood-vessels and lymph vessels, is poor in cells—there is little but a fibrous mass. The tarsal vegetations on the other hand, though fibrous also, contain a very large number of round cells, and the epithelium is not by any means so thick. Tailor and Bellinzona considered that they had found a peculiar organism which might be the ultimate cause of the condition, but this is more than doubtful; Terson hints that possibly the bacillus of the contagious wart may be found in these cases to have obtained a habitat in the conjunctiva. As regards treatment, he gives a high place to protargol, with destruction by the cautery of the larger masses. Arsenic internally, a mountain climate for a time, and still more a sojourn at la Bourboule, he regards as of much value in bad cases.

Demicheri puts the difference between a trachoma granulation and a "papilloma" of spring catarrh as seen by the microscope thus: in the former one has to do with the folded hypertrophied conjunctiva showing within the false papillæ true nodular infiltrations in the midst of delicate conjunctival tissue. The almost fibrous tissue of the spring catarrh gives an aspect entirely distinct, for one finds in it little or no cellular infiltration.

A sign which Demicheri considers a very valuable indication in cases of spring catarrh is the extreme readiness with which such eyes "redden" on the slightest friction of the eyelids, even in washing the face in some instances, or on giving the lids a slight rub with the fingers. A further important point in the diagnosis between spring catarrh and trachoma strongly insisted upon by Demicheri is that in the former the formation of "papillæ" in the upper lid is strictly limited to the tarsal surface and the

conjunctiva of the cul-de-sac is never attacked ; in a doubtful case he places much reliance on this distinction. In the matter of treatment he finds friction with calomel and an ointment of white precipitate with cocaine to give good results where the circumcorneal hyperplasia is the chief feature, and even, varied with scraping, in those with much change in the eyelids. W. G. S.

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FERRON (French Army). Unilateral Ophthalmoplegia as a Basal Lesion. *Annales d'Oculistique*, November, 1902.

SALOMONSOHN (Berlin). The Lesion in Ophthalmoplegia. *v. Graefe's Archiv für Ophthalmologie*, lv., 2.

The thesis which Ferron endeavours to establish may thus be expressed: Hitherto it has been too readily accepted that the third nerve has all its nuclei on the same side and the sixth has its on the opposite; that these "claims" have been "pegged out" too much in the fashion of a map, and with too little regard to vital conditions by physiologists and pathologists; that consequently it has been too readily accepted that all cases of ophthalmoplegia (interior and exterior) must necessarily be nuclear in their site; while that they may be basal in origin he proceeds to bring proof.

Serious doubts have been from time to time cast upon the older view that the fibres of the third nucleus do not cross the middle line at all—doubts arising from anatomical, physiological and clinical sides, which are not to be disregarded for the sake of a more diagrammatic course of fibres. Thus Grasset states, for example, that from the nucleus of the third nerve, which lies at the anterior portion of the cerebral peduncle underneath the corpora quadrigemina, fibres pass both uncrossed and crossed; there lies its chiasma. And in 1897 Bernheimer stated that in monkeys the centre for the inferior rectus is crossed; that of the inferior oblique is partly direct but



chiefly crossed ; that of the internal rectus is both crossed and direct ; and that of the superior rectus is direct. The superior oblique Ferron frankly writes down as crossed.

Grasset, to quote him again, suggests the matter in this form : that from each hemisphere there arises a "hemi-oculomotor nerve," right-moving or left-moving as the case may be, analogous to the half-vision centre and fibres ; and that there is a chiasma in the course of the motor path just as there is in the sensory. By reason of these circumstances, and even accepting Bernard's reservation that the intercrossing is only *quoad* fibres of association of conjugate movements, it is difficult, says Ferron, to accept the theory of a unilateral ophthalmoplegia of nuclear origin. It has of course at all times been a difficulty in the way of this theory that for a unilateral ophthalmoplegia to arise the (say) left third and sixth centres have to be associated with a lesion of the right fourth centre, while the left fourth remains intact. And further, such a situation requires that the damage should attack certain groups of cells in one third centre, and leave intact precisely similar groups of the opposite side.

In opposition to the theory of a basal lesion in such cases it is always urged that it is difficult to conceive how a process can attack certain bundles of fibres in a nerve and leave others quite unaffected, but since the third nerve has various different nuclei of origin and therefore presumably several well-differentiated bundles of fibres, there really is no particular reason why certain of these should not be attacked to the exclusion of others. And as a matter of fact cases have been diagnosed during life in which certain branches alone of the third nerve have been caught, and in which autopsy has clearly shown that the lesion was basal and not primarily nuclear with only secondary changes in the nerve ; notably one case recorded by Déjerine and Petrean, in which there was double exterior ophthalmoplegia, the interior muscles being unaffected, and the case was judged to be a clear one of nuclear affection, but on *post-mortem* examination this opinion was completely refuted, and both anatomical and histological

examination agreed in demonstrating clearly that the lesion was peripheral and not nuclear. Similar cases are reported by others with the same completeness of demonstration, and besides those instances others have been observed during life in which exterior ophthalmoplegia has followed upon an undoubted fracture of the base of the skull.

In short, on grounds both anatomical and clinical, Ferron concludes, not only that exterior ophthalmoplegia is not necessarily of nuclear origin, the currently accepted opinion, but that it is scarcely conceivable that it is nuclear, and that on the contrary it is basal.

Salomonsohn's paper is in supplement to that reviewed some months ago (*OPHTHALMIC REVIEW*, xxi., 245), and contains the further history of the patient on whose case the former article was based. It appears that after the former paper was published, the patient began to show various symptoms more or less inconsistent with the diagnosis which had been arrived at. Severe pain in the neck was complained of, and first a dull feeling and later complete deafness in the right ear, though there was no external condition to account for this. A little later papillitis of the left nerve was discovered; there was complete paralysis of the right facial nerve, the patient stumbled when walking and complained of giddiness. Gradually vision was completely lost in both eyes; his symptoms in other respects also became worse and worse, and he died with every sign of an intracranial (basal) tumour; unfortunately a necropsy was not permitted. Salomonsohn's conclusion then is so far the same as that of Ferron, viz., that ophthalmoplegia, even though complete and strictly confined to the exterior muscles, is not at all to be regarded as contradictory of a basal situation of the lesion.

W. G. S.

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S. RUGE (Griefswald). The Centre for Reflex Contraction of the Pupil. *von Graefé's Archiv für Ophthalmologie*, lv., 3.

Where does the centre for reflex movements of the pupil lie? There may be said to be at the present day two diametrically opposed opinions on this point: Bernheimer and his followers hold that the small-celled medial centre in the area belonging to the nuclei of the third nerve is the true situation, but Bach and others consider it to be spinal—in animals lying probably in the cervical and upper dorsal regions. Both opinions are founded upon pathological and experimental evidence, taken in connection with clinical facts.

The author of the present paper, Ruge, has carefully repeated the experiments of Bach, which he briefly describes. These consisted for the most part in the observation of the presence or absence of pupillary reaction in monkeys, cats and rabbits, decapitated through various levels in the cervical cord and examined, of course, instantly. He found that in the animal decapitated in the ordinary way pupillary reaction took place for a considerable number of seconds after "operation," but that he could never succeed in beheading it in such a way as to remove actually the whole of the cervical portion of the cord. If instantly after decapitation he inserted an instrument and destroyed this extreme upper end of the cord, no pupillary reaction whatever followed; he therefore concluded that the centre had then, but not till then, been destroyed: that in fact the extreme upper part of the cord in all probability contained the central apparatus for this reaction. The centripetal fibres he considered to be the posterior longitudinal bundle, but did not commit himself as to whether the motor fibres took their origin in the third nerve centre or from a more spinal situation and only joined the third nerve to be conveyed by it to the eye. Ruge, repeating Bach's experiments, agrees that after simple decapitation reaction continues for some forty to sixty seconds; he finds too that it is impossible thus to ensure separation of the entire cord from the

cerebrum and that immediately after the period has passed by during which a pupillary reaction can be obtained, maximum dilatation of the pupil comes on, to be succeeded in from three to ten minutes by the usual *post-mortem* half-dilatation.

In a second series of experiments he decapitated and immediately removed the attached fragment of cord by means of a sharp spoon; this could be done in thirty seconds only, but thereafter no pupillary reaction could be obtained; Ruge is thus seen so far to agree with Bach in this portion also of his investigations. In one respect the two series of Ruge's experiments showed a marked divergence, for the condition of the pupil varied very greatly. In one case, for example, the pupil remained in maximum myosis for twenty minutes, after which it dilated extremely slowly; in a second case the pupil became at once of medium size, while in a third maximum dilatation came on immediately. Obviously this might be due to variations in the degree to which the remains of the cord were destroyed in the decapitation and subsequent scraping. Bach, in his decapitations, says he left about 1 to 2 cm. of the cord; Ruge says that by varying his method his section passed through the medulla, about the height of the calamus scriptorius. Ruge also found an interesting difference at times between animals killed during or without previous narcosis; in the former case the cat's (for this part of his study he used cats chiefly) pupil showed a distinct reflex, while in the latter case, probably he says on account of psychic disturbance before death, no reaction could be observed, and the pupil was widely dilated. This fact of having observed pupil reaction after the entire spinal cord had been removed from the medulla and the cerebrum, a reaction which had lasted for thirty to forty seconds, Ruge claims with justice as very strong proof of the falsity of Bach's favoured situation for the pupil centre; one positive observation is worth one hundred negatives in such a matter as this.

Having got so far, the author pursued his investigations with the idea of finding how far "up" the medulla he

could destroy without involving this centre; for this purpose he employed careful destruction under deep narcosis, by means of intraperitoneal injections of chloral in rabbits, by means of chloroform in cats. He recites in particular two instances, the first in a rabbit, the other in a cat; in the former the medulla was divided just above the calamus, respiration ceased instantly, but a definite pupillary reaction was obtained even fifty-five seconds later. In the cat the line of section lay through the middle of the fourth ventricle, for fifty seconds thereafter a feeble, but quite definite pupil reaction could be made out. That there may be no question as to the accuracy of Ruge's observation he says that he was able to demonstrate this reaction even after so high a section to the satisfaction of two neurologists of so much skill as Schirmer and Westphal. The definite result of his investigations then is to cast the gravest doubts upon the cord-situation of the pupil reflex centre, and practically to prove that Bernheimer is right in assigning to it a cerebral position.

With much diffidence Ruge proceeds to offer an explanation of the immobile pupil of tabes and other conditions, the occurrence of which symptom it was which chiefly had led Bach to postulate a centre in the cord. As recent investigations have shown, the motor stimulus may expand through the ciliary ganglion into the sympathetic system. Should there be a pathological condition of the cord at the level of the origin of the communicating fibres to the sympathetic (upper dorsal and cervical region), then of course the sympathetic root of the ciliary ganglion may be affected in this way, and the ciliary nerves may not be capable of conveying the stimulus of the oculo motor nucleus. There is a break in the pupil reflex arc and immobility of the pupil will result. The Argyll Robertson pupil in tabes is thus readily explained, without it being necessary to suppose the existence of two lesions, one in the cerebrum and the other in the cord. A unilateral condition of immobile pupil can thus arise also if the area of the cord giving rise to the "sympathetic" fibres is diseased on one side, a symptom very difficult of explanation otherwise.

W. G. S.

P. ROMER (Würzburg). Sympathetic Ophthalmia as a Metastasis. *von Graefe's Archiv für Ophthalmologie*, lv., 2.

This article is preliminary to an account of experimental work not yet published. In regard to the pathogenesis of sympathetic ophthalmia, Römer assumes in the first place that there is no reasonable doubt that the disease is due to an infection of the eye by some form of micro-organism. The paths of infection and the conditions under which infection becomes possible are very imperfectly known. The organism in question must be specific for the eye, but indifferent for the organism as a whole; in illustration of which peculiar circumstance trachoma is cited as an example of a disease probably due to an organism which attacks the eye, but to which the rest of the body is absolutely indifferent.

The various theories which have been brought forward to explain the occurrence of sympathetic ophthalmia are discussed in detail by Römer, who thinks the importance of reflex irritation as actually causing, or at any rate predisposing to, a sympathetic inflammation has been very greatly over-estimated, and he criticises sharply the conclusions of Moll, Schmidt-Rimpler, and others. He considers that our knowledge of the pathogenesis of the disease will be best furthered by a study of the possible paths by which the infection reaches the second eye. From clinical and scientific evidence only two paths appear probable, viz., the optic nerve with its sheaths, and the blood-stream. Sympathetic ophthalmia occurs only in cases in which there has been in the exciting eye an inflammation of the uveal tract following injury. The total absence of meningitic symptoms at any stage of the development of the disease is strong evidence against the spread of infection along the nerve sheaths from one eye to the other. It seems hardly conceivable that an organism virulent enough to work such damage in the eye could reach the base of the brain and find its way to the second eye by way of the nerve sheath without causing an infection of the meninges, with attendant symptoms.

Römer criticises in detail the work of Deutschmann, and denies that from this observer's experiments any conclusion can be drawn regarding the pathogenesis of sympathetic ophthalmia in man. To make the experiment in the animal at all conclusive, the animal should not show signs of general septic infection, and it should be possible to demonstrate the propagation of the organism from one eye to the other by way of the nerve. Another great objection to the optic nerve path of infection on which Römer lays stress is the well-established clinical fact that sympathetic ophthalmia very often appears to begin in the iris and ciliary body of the sympathising eye, the posterior segment of the eye apparently escaping infection.

Römer is of opinion that sympathetic ophthalmia is best explained by regarding it as a metastatic infection by way of the blood-stream, a view originally expressed by Berlin. The infection, as previously stated, must be one which is pathogenic for the eye, but indifferent as regards the body generally. This hypothesis, he maintains, falls well into line with the clinical facts, nor is it inconsistent with the results of recent bacteriological research in other fields.

We feel sure that many of those who have had frequent opportunity of examining eyes which have excited sympathetic ophthalmia will agree with Römer in regard to the difficulties in accepting the optic nerve theory of infection. His experimental work on the subject should be full of interest.

J. V. PATERSON.

H. HERBERT (Bombay). *Practical Details of Cataract Extraction.* London: Baillière, Tindall and Cox. 1903.

Major Herbert, who has had in Bombay a very large experience of operating for cataract, presents in this little volume the results of his practical knowledge of the subject. The little book does not affect to be a scientific or exhaustive treatise on extraction of cataract ;

it is merely the record of the author's methods and views, and may prove very useful to anyone who expects to have charge of cases of this type, and has not yet had the opportunity to observe for himself all the dangers which may be lying in wait for him, and all the methods by which safety is to be reached. The book is pleasantly and unaffectedly written.

## OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

FRIDAY, MARCH 13, 1903.

Mr. WILLIAM LANG, Acting President. in the Chair.

### CASES AND CARD SPECIMENS.

*Separation of the Ciliary Body caused by Injury.*—Mr. Leslie Buchanan. The President said he had on one occasion excised an eye after injury by a rocket stick ; in this case the ciliary body was completely separated and driven back into the vitreous, together with the lens and the iris.

*Congenital Mal-development of the Cornea and Sclerotic.*—Mr. Leslie Buchanan.

*Two Drawings of Normal Fundi, Illuminated by means of the Mercury Vapour Lamp.*—Mr. Stephen Mayou. The light being produced by allowing an ordinary constant electric current to flow through a vacuum tube containing mercury from a platinum to an iron electrode, the resistance in the tube having first been broken down by a spark of high tension. Although the light is thus made extremely brilliant it produces an after-image of very short duration. When examined by the spectroscope it is found to be rich in blue and violet rays, but there is also a complete absence of rays from the red end of the spectrum.

The chief features noticeable in the fundus oculi when examined by this light are : (1) The colouring of the fundus is entirely altered ; (2) a retinal reflex is seen all over the fundus, being especially well marked along the course of the vessels but somewhat deficient at the macula ; (3) the arteries are well defined and can be traced to their very smallest ramifications ; (4) a much better perspective of the fundus is gained, *i.e.*, the varying depths of the retina, choroid, and sclera being made out.



Sketches of two eyes were exhibited, viz.: (1) The fundus of a girl aged 13, of fair complexion; light brown irides. In this case a patch of thinned choroid enabled the choroidal vessels to be very distinctly made out. The background appeared pale green instead of the usual red; the vessels appeared purple, standing out with unusual distinctness; the arteries appeared the same colour as the veins, the choroidal vessels of a deeper purple, over which the retina could be seen glistening. Mr. Mayou considered that this light might prove of much use in the differential diagnosis of retinal or choroidal disease. (2) The fundus of an albino rabbit.

*Paralysis of the Ocular Fibres of the Cervical Sympathetic associated with Aortic Disease.*—Mr. Arnold Lawson. The patient, a woman, aged 42, had noticed the drooping of her right upper lid for some two or three years, but was unaware that there was anything wrong with her heart. The usual signs of sympathetic palsy were well marked; slight ptosis, myosis, and recession of the globe. The pupil reacted readily to atropin, but was uninfluenced by cocaine, whereas the other pupil reacted readily to cocaine. The light reflex on the affected side was distinctly less marked than on the other side. The heart was much dilated, the apex being in the seventh intercostal space in the nipple line, and over the aortic region a systolic and loud diastolic murmur could be heard. Mr. Lawson considered that the condition of the heart was the only clue as to the cause of the sympathetic palsy, but the connection was not very obvious. Possibly pressure on the cardiac sympathetic plexus might be the cause, but if so one would expect similar symptoms to be present on the left side as well, which was not the case.

*Chronic Irido-cyclitis (probably of Sympathetic Origin) following a Rupture of the other Globe Twenty-one Years Previously.*—Mr. Arnold Lawson.

*Macroscopic and Microscopic Preparations to Illustrate the Effect of Injuries to the Eye of the Child during Labour.*—Dr. W. E. Thomson and Dr. Leslie Buchanan.

(1) Retroversion of the lens and vitreous body from extreme pressure during craniotomy. In this eye the lens and vitreous were found to have been completely retroverted, the lens lying nearest to the optic disc. The pigment was stripped off the ciliary body and had become adherent to the pars ciliaris retinae. In one half of the globe the cornea was lightly stained, and a rupture of the corneal tissue could be made out as a clear groove on its posterior surface. The globe before being bisected was quite intact.

(2) Rupture of the posterior elastic lamina of the cornea, with hæmorrhages into the retina and optic nerve, after severe forceps delivery. Several clear bands were visible on the posterior surface of the cornea, which was covered with a layer of blood except in the spots covered by these bands. Microscopically these bands were found to correspond to ruptures of the posterior elastic lamina. A large number of hæmorrhages were present in the retina and one in the centre of the optic nerve.

(3) The anterior half of the eye of an infant showing a very extensive hæmorrhage into the anterior chamber.

(4) Extrusion of the eyeball during forceps delivery. In this case a spoon-shaped depression of the infant's skull was the result of the pressure of the sacral promontory. The combined effect of the pressure applied by the forceps, and the resistance offered by the sacral promontory had been sufficient to expel the eyeball from the orbit and to sever the optic nerve and all the muscles; the globe itself, however, was uninjured, nor had there been any laceration of the eyelids.

(5) Meridional folds of the retina. The pressure in this case had been considerable, and the globe on section showed that the retina had been thrown into folds, probably due to œdema.

*Tumour in the Region of the Macula.*—Mr. Walter H. H. Jessop. The patient, a woman aged 63, had fallen about fifteen years ago on the back of her head and had much head pain as the result. Nine months ago she struck her right eye against a brass gaspipe, after which the eyelids were much swollen and the eye became painful. Lately she had suffered from constant headache and loss of memory. Vision : R.  $\frac{6}{60}$ , L.  $\frac{6}{18}$ ; the pupils were both equal and reacted normally. The tension was normal.

Ophthalmoscopically the media of the right eye were clear, the optic disc hazy and its surface indistinct, and the vessels normal; about  $\frac{2}{3}$  disc diameter from the disc, itself an oval, non-transparent swelling was visible, covered by the retina, about 3 disc diameters in length and  $2\frac{1}{2}$  in height, with fairly distinct edges and greyish in colour. The retinal vessels were seen coursing over it. At its highest part it was raised 4 dioptries. Scattered over the fundus were several cholesterin crystals and yellowish white retinal spots; also along one of the inferior retinal temporal veins, and apparently starting from the vein, were numerous black retinal pigment spots arranged in a streak. Also above and below at the periphery were visible isolated spots in the retina. The field of vision for white was full and showed no scotomata, but for red a small central scotoma was present. The left fundus was normal with the exception of a slight paleness of the optic disc.

Mr. Jessop was of the opinion that this must be a connective tissue tumour. He remarked that Mr. Silcock had had a case of gumma which had been published in the Transactions and in which the eye had been excised.

Mr. Hartridge said he showed a case fourteen years ago of an apparent growth at the macular region, and since then it had changed considerably. It had a height of 8 dioptries, and had shown hæmorrhages on the top of it, with a great deal of retinal change around it. The patient was still alive and apparently in fair health although he was passing albumen in his urine. The eye had not been excised.

Mr. Silcock said he had shown the case mentioned by Mr. Jessop three years ago, and it was published in the Society's Transactions, in vol. xix. The condition in this case had undergone absolutely no change since first seen. He believed that such growths were composed of cicatricial connective tissue. There was in his case marked disseminated choroiditis, and he thought there was some also in Mr. Jessop's case. In his case he had punctured by plunging a needle through the sclera while observing it with the ophthalmoscope, but no blood came out.

*Endothelioma of the Cornea.*—Mr. W. W. Sinclair and Mr. J. Herbert Parsons. This female patient had been under treatment intermittently for the last twelve years. When first seen there had been a small growth at the outer side of the corneo-sclerotic margin of the right eye, not larger than a hemp-seed, but it appeared to be of such a suspicious nature that it was eradicated by means of the galvano-cautery. Five years later there was a recurrence of the growth, just above the site of the previous one, which was treated in a similar manner, as were two others which appeared at intervals of about three years. In May, 1902, a soft gelatinous-looking grey circumscribed mass was noticed at the upper part of the cornea, slightly raised above the corneal level. This continued to increase in extent and thickness, and in January of this year it was removed by means of a keratome, leaving exceptionally clear cornea behind. In February, just beyond the limit of the growth removed, a small greyish area was apparent, and on the site of the original growth were seen a few greyish spots, slightly raised. The growth did not appear to penetrate beyond the epithelial layer of the cornea. Pathologically the growth appeared superficial, as no true corneal lamellæ were to be seen. The cells resembled the rapidly-growing superficial epithelium of inflammatory conditions, but without any sign of epithelial infiltration in the deeper layers. The growth consisted of masses of epithelioid cells arranged in an

alveolar manner, enclosed in capsules of spindle-celled fibrous tissue. These epithelioid cells were considered to be endothelial in origin, and varied greatly in size and shape and conditions of development. From all appearances the opinion was that the growth was an endothelioma.

Sir Anderson Critchett said that he had seen the case twelve years ago when there was an exceedingly small growth not larger than a hemp-seed, which he eradicated, going deeply into the tissue. For at least four years there was no return of the growth, but somewhat later it reappeared a little above the former site, and this time he treated it with the galvano-cautery; this had been done on several different occasions. When first seen her age was 42, now it was 54.

*Carcinoma of the Conjunctiva with Peculiar Pigmentation.*—Mr. R. W. Doyne. The growth was from the conjunctiva of the upper lid, but the peculiar pigmentation was of the conjunctiva of the lower lid. It had been freely removed six months ago, and was now in course of recurring.

The President asked what Mr. Doyne proposed to do. He thought the disappearance of the pigment in some other similar cases mentioned was remarkable.

Mr. Doyne, in reply, said he intended to remove the recurrence, but did not intend to attempt to deal with the pigment, as he hoped it would disappear as in the other cases.

Mr. Wallace said the case referred to by Mr. Doyne came under his care at St. Thomas's Hospital, but nothing drew attention to the eye, since the man had come in for some carcinomatous growth of the bowel, which he thought was a melanotic sarcoma; upon this he cut down and removed it. On hearing that the man had had a growth removed from his eye, he then concluded that the tumour in the abdomen was a secondary one. The man died at the end of the year in which his abdomen had been operated upon. There were well-marked pigmentary growths in the skin.

*Intraocular Hæmorrhage in a Young Man in each Eye: Recurrence.*—Mr. R. W. Doyne. The left eye had been affected five years ago, when he had bare perception of light for five months. On recovery cicatricial bands in vitreous and retina were observed. At that time the right eye was also slightly affected, chiefly outwards and downwards. At the present time there is a recurrence in the right eye at the same place, down and out. The hæmorrhage was venous as on the first occasion.

*Leak in the Vitreous.*—Mr. R. W. Doyne. This patient, a man, had been shown before the Society five years ago, at which time

he had had a leak in the vitreous and the vitreous was full of blood. This eye, the left, afterwards cleared up, and a very good vision had returned in it. A few days ago the patient came back with a leak in the right eye. Two or three leaks had occurred within the last five years.

Mr. S. J. Taylor asked whether chloride of calcium had been used in this case, since Prof. Wright, of Netley, had proved that this substance increased the coagulability of the blood; if given in doses of 13 grs. it would probably cure the trouble.

Mr. Bishop Harman said a friend of his suffered from hæmorrhages, and he had been prescribed chloride of calcium and had taken it for two months without making any difference, but he went to Llandrindod Wells, and after taking the water there the hæmorrhage stopped. He had asked his friend to stop the water and see the effect. This had been done, with the result that the hæmorrhage had recommenced; on resuming the water the hæmorrhage stopped, and this had occurred six times. An analytical report of the water showed it to contain chloride of calcium.

*Rectangular Connective Tissue Film veiling the Optic Disc.*—

Mr. N. Bishop Harman. In this patient, a woman aged 25, vision was  $\frac{6}{6}$ , but the right disc was a perfect circle in outline; the artery appeared a little to the nasal side of the centre, then it divided into four equal-sized trunks; completely covering the disc except for one small edge was seen a film-like opacity, attached to the edge of the disc and following its outline below and out, but having a rectangular border overlapping the disc and vessels above and in, and apparently attached to the superior vein, the lower angle being attached to a small vein and definitely continuous with a delicate coat round the vein. All the vessels on the disc had perivascular thickenings. No trace of the hyaloid artery was to be made out. Mr. Harman considered it to be an exaggeration of the perivascular tissue so frequently seen about the disc, and in this case drawn into its peculiar form by gradual expansion of the globe.

*Hole at the Macula.*—Mr. G. H. Goldsmith. The patient, a stage carpenter, aged 36, while shifting scenery in February last, was struck in the right eye by a sharp piece of timber, which injured the upper lid as well. Previous to the accident the patient stated that his sight in this eye was perfectly good. Now he could only count fingers at a few inches. The fundus showed a deeply cupped disc, and about one disc diameter from the outer side of the macula a patch of pigment disturbance about the size of the disc and surrounded by pale haloes. Within this was an irregu-

larly-grouped mass of pigment, at one part of which the sclerotic could be seen. A vessel from the disc coursed over the patch and another ran into it. Several retinal hæmorrhages and hæmorrhages into the vitreous were present.

The President said he had recorded a case in vol. xxi. of the Transactions similar to this, which had been described as rupture of the lamina cribrosa and optic nerve fibres of the papilla. In this case the field of vision showed that the nerve fibres had been ruptured right across.

Mr. Adams Frost inclined to the view that it was a congenital malformation.

Mr. Doyne said he had a very similar case in which the patch was actually touching the disc. In his case there was no history of accident.

#### PAPERS.

*Anophthalmos in a Chick.*—Mr. E. Treacher Collins and Mr. J. Herbert Parsons. This chicken was the only "abnormal" representative of a large family of chickens bred from the same Indian game cock and Dorking hen. It had been hatched in an incubator and was healthy, but had been born blind. It had been killed when four days old and its head examined. The examination showed well-formed eyelids on each side, which on being separated disclosed a small eyeball with a clear bright spot in it representing the cornea on the left side only; on the right side no eyeball could be made out. The head was decalcified and cut into a large number of sections, passing across both orbits. These sections under the microscope showed that on the right side no optic nerve, retina, or lens were present, only a ring of hyaline cartilage situated a little depth from the surface corresponding to the hyaline cartilage in the sclerotic of the left eye, with a fibrous covering and striated muscle. The interior of this ring of cartilage was filled with tissue resembling that of the choroid, fibrous tissue, blood-vessels, and nerves like the ciliary nerves being present, as well as some delicate, fine branching pigmented cells, in the centre of which was some much denser pigmented tissue in the form of irregular dots and twisted, branching lines. This tissue corresponded with that in the other eye, but was rather more condensed and not pigmented like the epithelium of retinal origin. There was no tissue in the interior of the ring or near it resembling retina or optic nerve. The eyelids and conjunctival sacs on this side were well developed. Nowhere could any down-growth of epithelium or anything representing the lens be distinguished. On the left side, the eyelids

and conjunctival sacs were normal. The cornea was small and the anterior part of the eyeball much flattened. The hyaline cartilage was here normal, presenting a thickened posterior part through a gap in which the optic nerve passed. In the cornea of this eye no anterior limiting membrane was present, and the substantia propria of the cornea was imperfectly developed, being largely composed of spindle cells; there was no posterior limiting membrane of Descemet. The lens was lying in immediate apposition with the back of the cornea above, but below in an interspace between the two some tissue of the nature of the stroma of the iris intervened. The choroid appeared to be normal and ended anteriorly in the ciliary body, which was much distorted. The iris below was absent, but above, the ciliary body and iris turned backwards behind the lens, lying in close contact with its posterior surface; behind this there was pigment epithelium and imperfectly formed retina in which the various layers were not differentiated. The iris from above extended so far down on the back of the lens that its pupillary margin was quite at the lower border. The lens itself was imperfectly formed and was completely surrounded by a hyaline capsule with long fibrous-like cells, and in the very centre coagulated albuminous material, with what looked like large squamous epithelial cells in it. On the right side, therefore, there was absolute non-development of all portions of the eye formed from neural epiblast.

In this case from the appearances of the sections through the orbit and the complete absence of all round cell inflammatory exudation, it was evident that the condition of the right eye was not one of phthisis bulbi from inflammation before birth, and the absence of the essential nervous mechanism made it fair to speak of this condition as one of anophthalmos.

*The Treatment of Trachoma by "X-rays"* (with cases and lantern slides).—Mr. Stephen Mayou related the case of a patient who had already been shown before the Society. A girl, aged 14, had been affected with trachoma in the right eye four and a half years, and in the left five years. She had been under varied treatment at various hospitals. Both lids in both eyes were covered with large flat granules and well-marked scarring. There was pannus in both, but in the right only in the upper one-third of the cornea, while in the left it completely covered the cornea. After fourteen exposures for five minutes each at a distance of nine inches the granules disappeared from the lids. The pannus in both began to clear, more so in the left than in the right, this eye having been treated with copper sulphate previously.

Several slides were shown illustrating the effect of the "X-rays" upon rodent ulcer, and of trachoma treated in the same manner and contrasted with slides showing the result of treatment (histologically) by copper sulphate.

The President said that a case under his own care had improved very rapidly under "X-ray" treatment.

Mr. Cargill stated that a very encouraging point in favour of this treatment was the rapidity with which amelioration was obtained, six months of the treatment being more beneficial than from eighteen months to two years of the ordinary methods.

Mr. Sydney Stephenson endorsed what Mr. Mayou had said as regards the painlessness and the practical freedom from complication. He considered that the best results could be obtained by the high frequency current applied directly to the palpebral conjunctiva; he had seen trachoma cured by five sittings, lasting ten minutes each and extending over a fortnight. He quite agreed that the difficulty was to know when to stop or when to consider the case cured.

*An Account of Certain Cases of Injury to the Eye of the Child during Labour, with a Demonstration of the Microscopic Appearances in Cases presenting a Linear Opacity as the Result of Traumatic Keratitis of the Newly Born.*—Dr. W. E. Thomson and Dr. Leslie Buchanan.

*Notes of a Case of Dislocation of the Eyeball.*—Mr. J. B. Lawford.

REGINALD E. BICKERTON.

## CLINICAL NOTES.

INCISION FOR GLAUCOMA IRIDECTOMY.—S. M. Burnett meets the difficulty of opening the shallow anterior chamber by cutting from without inward. He makes successive strokes with the point of a Graefe knife, following the curves of the corneal base, as far behind the clear cornea as may be desirable for the most peripheral position of the wound. The essential idea is to cut the layers at the sclero-corneal junction as evenly as possible throughout the whole extent of the incision. The bottom of the wound thus carefully made finally gives way at some point, and



through this opening there is a gush of aqueous and usually a prolapse of iris. The incision may then be completed with a knife having a bulbous point, or even with blunt scissors. The high tension of the globe renders easy the making of the incision up to the time of perforation. Bleeding can be prevented by the use of a solution of adrenal extract.—*American Journal of Ophthalmology*, April, 1902.

THE INFLUENCE OF THE SEASON OF THE YEAR UPON ACUTE GLAUCOMA.—In recent books on ophthalmology little or no notice is taken of the fact that cases of acute glaucoma are more frequent at certain periods of the year than at others, although it is said that even the ancient Arabic physicians were aware of the circumstance. In regard to certain other eye diseases, on the contrary, the effect of weather is very manifest; for example, spring catarrh becomes worse in hot weather, and iritis more frequent in cold and damp. During the last seventeen years Hirschberg's notes have been kept in clinique of 83 patients suffering from acute glaucoma, presenting 102 attacks; of these 83 persons, 64 were women—which bears out the statement made by several authors that women suffer more frequently from acute "inflammatory" glaucoma than do men. After deduction of attacks induced by a mydriatic, cases of secondary and of hæmorrhagic glaucoma, and others in which the history was equivocal, 102 remain, and of these 65 occurred between October and March, and only 37 in the warmer half of the year. The number was at its maximum in January, at its minimum in June. Steindorff suggests that there may be some relation on the one hand between the long bright days of summer, with their pupil-contracting glare and their freedom from glaucoma, and on the other hand between the short dull days of winter, in which the pupil is dilated, and the greater frequency of glaucoma.—*Centralblatt für praktische Augenheilkunde*, February, 1903.

PANOPHTHALMITIS FROM BACILLUS LANCEOLATUS.—Weeks reports a case in which a youth presented him-

self with a panophthalmitis developing in the right eye subsequent to a blow believed to have been received about five or six days previously. There was not the smallest indication of any solution of continuity in conjunctiva or cornea; even by the time of his first consultation vision was gone completely. Attempts to save the eye having entirely failed, evisceration was performed. From the contents of the globe growths of *Bacillus lanceolatus*, apparently in pure culture, were obtained, and verified by inoculation into a rabbit. There has been no history of nasal or other local disease, no pneumonia, and no influenza.—*Ophthalmic Record*, February, 1903.

OPTIC NEURITIS AS THE RESULT OF THYROID TREATMENT.—A woman, aged 58, suffering from myxædema, was put on thyroid extract for five weeks with very marked improvement in her general symptoms. By the end of that time there were no signs of thyroidism; the urine contained neither sugar nor albumin. But the patient then began to complain of serious blurring of vision, which increased so rapidly that in about nine days the left eye had no perception of light, and a feeling was present as if a somewhat thick veil hung in front of the eye. At this time the ophthalmoscope showed evident optic neuritis, which eventually passed on into atrophy. In the right eye, deterioration of the vision of which began about a fortnight after the left, sight was not reduced below  $\frac{5}{15}$ . The administration of thyroid was at once interrupted, iodide of potassium given, and though the left eye never improved at all, the inflammatory signs in the fundus of the right passed away without atrophy occurring, and the patient secured vision of  $\frac{5}{10}$ . A very similar case will be found noted in the OPTHALMIC REVIEW. —(Aalberts-berg) *Wiener klinische Wochenschrift*, vi., 1903.

## ANGIOID STREAKS OF THE RETINA.

By W. T. LISTER, F.R.C.S.

STRIÆ and streaks of the retina are found in many conditions.

Excluding cases of (1) Obvious inflammatory conditions, such as albuminuric or diabetic retinitis, (2) retinitis proliferans, in which the striæ are situated internal to the retinal vessels, and (3) striæ running in the course of the retinal blood vessels,—there are two main groups of cases, namely those of *retinitis striata* and *angioïd streaks of the retina*, in both of which the striæ lie external to the retinal vessels.

In *retinitis striata* we find white glistening bands often associated with pigment, which pass with a straight or only slightly curved course from near the disc towards the periphery. These bands may branch, and often end in a patch of degenerated retina. There is frequently an associated detachment of the retina. The disease is, as a rule, monocular and the vision of the affected eye is bad.

*Angioïd streaks of the retina* appear as a system of coloured, irregular, branching lines, radiating from the region of the optic disc. The disease is binocular and the vision differs considerably in different cases. It is this latter group which I wish to discuss in some detail.

A considerable number of cases have now been

collected, and I propose first to summarise the chief points which have been found.

The *histories* are of no special interest, having little in common.

The *age* of the patient points to the condition being one of middle life.

The disease, as stated above, is binocular.

The *vision* varies considerably. In some cases, though the streaks are well developed, the acuity of sight is normal and the fields show no contraction; in others the vision is found to be poor and deteriorating. There appears to be no constant concomitant disease of the eye.

As to the streaks themselves, the descriptions are very similar. As seen by the ophthalmoscope they all lie behind, that is external to, the retinal blood vessels. There is generally a more or less circular band round the disc, from which the other streaks radiate towards the periphery, but apparently they never reach it. The streaks branch and the branches may anastomose. Their outline is sharply defined and their course is curved or angular, and corresponds neither with that of the retinal nor of the choroidal blood vessels. The width of the streaks varies considerably from half to four times the diameter of the retinal veins at the disc. Their colour is variously described as red, brown, reddish brown, grey or lead colour. De Schweinitz mentions that a streak when first seen was red and at a later observation became pigmented and brown.

The surrounding retina has in a few cases been apparently normal, and in these the acuity of vision was good.

In many there has been described a whitish opacity round the disc and the coloured streaks have been

bordered by light grey or white broader bands, either on one or both sides. These accompanying bands in some instances have been seen to develop late in the disease. Retinal hæmorrhages have been found in several, and in these cases fresh streaks appeared at the site of the hæmorrhage, when the latter was becoming absorbed. I think it is important to mention that in others neither hæmorrhage nor any of the usual indications of past or present hæmorrhage were discovered.

Macular and peripheral changes due to retino-choroiditis have been seen, and in one case there was a coarse mottling of the periphery of the fundus with yellowish red spots, which in places were confluent.

The pathology of this group is still apparently quite unsettled, and I have not been able to find any report of a microscopic examination of an eye with this condition. Various suggestions, however, have been put forward to explain the appearances which have been found. The observations of Nieden, Holden and De Schweinitz, that streaks developed after retinal hæmorrhages, has given rise to the well recognised view that the streaks are formed as a result of the hæmorrhages, and the pigment in the streaks is derived from the blood corpuscles.

One naturally asks why, if the pigment be hæmatogenous (which point has not yet been determined), should it be arranged in streaks?

Knapp suggests that after a hæmorrhage "the blood corpuscles lie more or less loose in the retina, and are by the tissue currents collected into lines or irregular figures, such as we see in the sand of the seashore." But the streaks lie external to the retinal vessels, as is seen by the ophthalmoscope, and internal

to the rods and cones, as has been shown in one of Walser's cases, when, in demonstrating Purkinje's figures, the shadows of these streaks as well as the retinal vessels were perceived by the patient. They must therefore lie in the nuclear and molecular layers of the retina.

The lymph vessels in which the tissue currents will be most marked, pass, according to Schwalbe, with the retinal blood vessels. If Knapp's view were correct, the hæmatogenous pigment should be deposited in the course of the retinal vessels, which is not the case.

Again, for the streaks to be always the result of hæmorrhages, the latter would have to be very widely distributed, and it would seem likely that in every case where the streaks occurred, some sign of either past or present hæmorrhage would be found, whereas some cases, as I mentioned above, showed no such sign anywhere in the fundus. I am therefore inclined to think that retinal hæmorrhages may be concomitants, but are not at any rate the sole source of the streaks.

Another hypothesis is that the streaks are due to some chronic form of retinitis; this of course is very possible, but there remains to be explained the fact that the retinitis takes the form of streaks.

Fretori suggests that the condition is congenital.

The system of radiating striæ which branch and anastomose suggests naturally that they are associated with some vascular system, carrying either lymph or blood. There seems good reason for not considering them to be lymph vessels; can we find any evidence in favour of the view that they are associated with some new system of blood vessels?

I have come across two specimens which I think throw light on the condition.

CASE I.—Right eye removed from a man aged 40. Both eyes had been operated on for cataract; the left had a normal fundus; the right, which was removed, had become blind as the result of irido-cyclitis and secondary glaucoma. The anterior half of the eye, on section, has the ordinary appearances following irido-cyclitis.

The interesting part of the specimen is the retina. It is greatly degenerated and opaque looking, and there is a considerable amount of pigmentary change. There is a small detachment on one side; in the equatorial region the retina is split into two or more layers, and there are three small holes to be seen. Anteriorly the retina is drawn forwards and mesially to the back of the remains of the lens capsule. The most striking point, however, is the existence of distinct streaks in the substance of the retina, which in places are pale, and in others deeply pigmented. These streaks lie external to the retinal blood vessels and internal to the choroïd. Microscopic sections show great degeneration of the retinal elements, a loose reticular connective tissue to a great extent taking their place; the rods and cones have disappeared, the nuclear and reticular layers remain only very partially, but sufficient to show the different levels. There is considerable irregular pigmentation and in places infiltration of the retina from the lamina vitrea.

At the part corresponding with the most marked streak the retina is detached, and here there are seen deposits, both on the external surface of the detached retina and in its substance, which are partly granular and partly cellular and contain pigment.

In this deposit in several places are well marked blood-vessels, containing unmistakable red corpuscles (see plate). Their walls are in places undergoing calcareous changes, which account for their macroscopic whitish appearance.

The choroid is infiltrated with small round cells, and the vessels are engorged with blood; bone formation is commencing.

The disc is cupped and the surface has been covered

with a layer of new connective tissue. In a consecutive series of sections a small vessel can be traced running from the ciliary body to the overlying retina.

CASE 2.—A staphylomatous eye removed from a man aged 24. The eye had been affected since infancy, and at the time of removal there was no perception of light. The other eye was normal and  $V. = \frac{6}{6}$ .

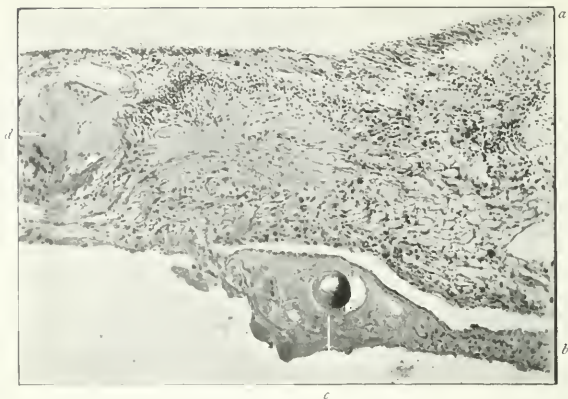
The anterior half of the excised eye has the ordinary appearances following a perforating ulcer of the cornea, with loss of lens, entanglement of iris in the corneal opening and subsequent atrophy of the iris and ciliary body. The retina and choroid are *in situ*, and the disc is cupped. The retinal arteries appear as white lines with a double contour, the veins do not show obvious degeneration to the naked eye and some contain blood.

There is marked pigmentation of the retina, similar in appearance to that found in retinitis pigmentosa, and occurring also in *branching streaks*. One of the largest of these streaks passes to the margin of the disc.

The microscopic sections I obtained are unsatisfactory owing to the calcareous matter which caused tearing of the sections. This is unfortunately the case especially with those through the pigmented streak as it passes into the disc, so that I am unable to trace its course at its entrance into the nerve. However, the other sections show the following changes clearly, viz., atrophy of the retina, disappearance of the rods and cones, infiltrations from the lamina vitrea, which in places are calcareous. The retinal arteries show very marked calcareous degeneration of their walls and the lumen is blocked with a coagulum which contains crystals. The veins have thickened walls and in some the lumen contains a coagulum. In the external layers of this degenerated retina in places corresponding with the pigmented streaks, well marked obliterated blood vessels of new formation are seen. They have clearly defined walls which are pigmented and have undergone calcareous degeneration, and the lumen, like that of the other retinal vessels, is blocked. The choroidal







*a b* Degenerated detached retina.

*a* internal surface.

*b* external surface.

Blood-vessels—artery and vein—of new formation surrounded by exudate.

*d* Mass of exudate in the retina.

B. FROM CASE 2.



*a* Retina.

*b* Choroid containing thick-walled vessels.

*c* Retinal vessel with calcareous walls and blocked lumen.

*d & d* Vessels of new formation in the deeper layers of retina.

arteries show great thickening of their walls in places and the veins are engorged with blood.

In both specimens I am in doubt as to the origin and connections of these newly formed vessels, there being no obvious communication with either the retinal or choroidal vessels.

In Case 2 a streak passed into the disc, and I imagine its contained vessel joined with the blood vessels of the optic nerve, but I was unable to determine whether it communicated with the arteria or vena centralis.

In Case 1 I traced a vessel passing from the ciliary body to the detached portion of retina lying on it.

Thus it would seem that two possible sources of the new vascular system are the vessels of the ciliary body and those of the optic nerve.

The point which these two cases have in common is—macroscopic pigmented branching streaks lying external to the retinal vessels, but internal to the choroid, which microscopically are seen to be associated with blood vessels of new formation.

In Case 1 there is besides a well marked infiltration of the retina which surrounds the new vessels, and also occurs as a rounded mass in cross section lying near the vessels and appearing to take part in the formation of the streak.

In Case 2 there is no similar infiltration round the vessels.

These specimens are of course of a totally different class from the collected cases of angioid streaks, but I think they have interest in that they show (1) that a new system of blood vessels may occur in the deeper layers of the retina; (2) that these vessels appear to be the essential factors in a system of pigmented striæ, similar in level and in many ways in appearance to those seen in cases of angioid streaks.

This being the case, there seems to be fair justification for putting forward the suggestion that angioid streaks are also associated with the formation of new vessels in the retina.

As to the cause of their appearance, a possible hypothesis is, that in the first place some chronic inflammatory change takes place in the retina, and secondly, vessels penetrate into this chronically inflamed tissue, in the same way that vessels make their way from the optic disc into exudate or hæmorrhage into the vitreous. The vessel walls become pigmented or undergo calcareous changes accounting for the colour of the streaks and the glistening patches seen in their course; while the presence or absence of exudate round the vessels, or degeneration of the surrounding retina, accounts for the presence or absence of the broad white bands running with the streaks.

It seems to me to be quite likely that on the above hypothesis, hæmorrhages of the retina may be derived from the newly formed vessels.

Such widespread retinal changes one would expect to be associated with bad vision. The cases in which the vision is normal may possibly be congenital, as Fretori suggests, and due to changes which occurred *in utero*, at a time when the retina has not become flattened out, and the internal layers might escape permanent injury.

I am fully aware that the above suggestions are inconclusive in the absence of further evidence, but if this paper should elicit new facts which either put forward a better working hypothesis or substantiate this immature theory, it will, I think, have justified its appearance.

I have to thank Mr. Waren Tay and Mr. Stanford

Morton for thus kindly allowing me to make use of the specimens removed by them, which came into my hands while Curator at the Royal London Ophthalmic Hospital.

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## REVIEWS.

- E. B. COBURN (New York). An Experimental Study of Glaucoma.  
 M. U. TRONCOSO (Mexico). Pathogenesis of Glaucoma. *American Annals of Ophthalmology*, April and July, 1902.

Coburn discusses the various theories of the causation of glaucoma and the possible factors, and he concludes that the mischief arises in some changes in the ciliary body and its processes. Previous attempts to induce glaucoma in animals are divided into three groups: (a) Those which aimed at inducing secondary glaucoma; (b) those which sought to close the exits of the anterior chamber by gross mechanical means or by the direct introduction into the eye of foreign material; (c) the experiments of Geering, who made subconjunctival injections of sublimate solution and produced anterior synechiæ but no glaucoma. About all that has been proved is that the closure of the exits produces plus tension. No one has succeeded in showing the natural

mechanics of the disease. Four series of experiments were undertaken by Coburn himself:—

(1) Studies on the course of the lymph streams in the anterior segment of the eye. The results were identical with previous work by others. The large size of the exits in the eyes of animals as compared with those in human eyes was particularly noted.

(2) Studies on the effect of increased pressure in the anterior and posterior chambers. Saline solution was injected under pressure varying up to 50 mm. of mercury. With the needle in the anterior chamber the cornea became steamy, the pupils dilated, the corneal epithelium roughened, and blebs appeared. The anterior chamber was deeper than normal. With the needle in the vitreous slight pressure produced no effect on the position of iris, but when increased the vitreous was either displaced with a forward movement of the lens, ciliary body and iris, or the congested ciliary processes and the lens were factors in the forward propulsion of the iris. A fibrinous deposit was found in the anterior chamber, lying on the iris and extending into the meshes of the pectinate ligament. The corneal epithelium and the stroma were œdematous, the former sometimes stripped off.

(3) Observations on the result of the introduction of foreign material in the eye. In almost every case the reaction was too violent and the ultimate result hypotony.

(4) The indirect introduction of substances through the circulation and the closure of the channels of exit by effecting changes in the ciliary region and aqueous. Two groups of substances were injected:—

(a) Acetic and phosphoric acids, adenin, adenin hydrochloride, calcium chloride, calcium phosphate, calcium sulphate, calcium sulphide, sodium urate and uric acid.

(b) Atropin, eserin, pilocarpin, and salicylate of sodium.

The results of these experiments may be summarised as follows:—

(a) Intraocular changes may be induced by deleterious substances in the circulation.

(β) The effect of irritating material in the circulation

induces first congestion of the ciliary body and iris and then vesicle formation in the ciliary region, followed by fibrinous exudate into the anterior and posterior chamber.

(γ) Fibrinous and albuminous exudates have a predilection for the anterior chamber, depositing or forming on the anterior surface of the iris and in Fontana's spaces.

(δ) These deposits, usually accompanied by deep anterior chamber, block up the exit at the angle and increase the tension. When the irritation is brief the exudate may be absorbed and the tension return to normal. If the irritation is sufficiently prolonged or intense glaucomatous iritis with its attending evils may ensue.

(ε) The cause of glaucoma is apparently some lesion which pushes the iris and the lens forward, making the anterior chamber shallow and blocking the exits. This cause is to be found in the ciliary body and processes. While the experiments have not added directly to our knowledge of the causes of glaucoma, they have thrown new light on the functions of the ciliary body and iris and on the conditions under which serous and fibrinous iritis and cyclitis occur, and show that the intraocular circulation of certain substances is quite sufficient to produce these diseases, and therefore the constitutional elements should not be disregarded in their treatment.

Coburn thinks his experiments proceeded on the lines of eventual success which will be achieved only by introducing into the circulation some substance which is a physiological constituent of the body, but which in abnormal amounts causes vascular changes, or is some end-product of tissue metabolism that is retained by reason of faulty elimination in these experiments. The relative failure in these experiments hitherto is ascribed by Coburn to the anatomical difference between animal and human eyes and the intermittence of the action of the deleterious substances.

To turn now to Troncoso's paper. Anatomical and pathological investigations, according to him, have not so far helped us one step forward in the knowledge of the etiology of glaucoma. Although the precise quantity of

fluid secreted in the eye has received much attention, no one (?) has previously investigated the quality of the fluid.

Troncoso divides his study into the following stages:—

- (1) Essential glaucoma ; (2) the effect of iridectomy ;
- (3) chronic simple glaucoma ; (4) secondary glaucoma ;
- (5) experimental glaucoma.

(1) *Essential Glaucoma*.—Aqueous removed from glaucomatous eyes and chemically examined was found to contain in all cases a notable increase of the albuminoid constituents. Since filtration of the aqueous is in reality purely a question of exosmosis, the higher proportion of albumin is manifestly a great hindrance to the escape of fluid from the anterior chamber. In 19 analyses of aqueous from glaucomatous eyes, the density varied from 1.0055 to 1.022,—higher, therefore, than that of physiological aqueous (1.005 to 1.012).

Hypertension is a symptom subordinate to the difficulty of exosmosis. It is a symptom common to several diseases, whereas glaucoma is a disease *per se*. It may be produced (a) by increased difficulty of excretion; (b) mechanically, by blocking of the iridic angle; (c) by increased secretion due to increased blood supply: this form is usually only temporary. The albuminoid substances may come from two entirely distinct sources: (1) As a result of inflammatory processes in the anterior segment of the eye loading the aqueous with fibrin exudate, &c.; (2) as a result of some vascular disturbance similar to that seen in interstitial nephritis. Pathological research has shown the frequency and gravity of alterations of the blood-vessels. They are principally lesions in senile arterial sclerosis, in endo-vasculitis, which are found in the vessels of the iris, ciliary body and retina. Various authors have described the lesions found. The production of aqueous being chiefly a phenomenon of excretion can be compared to the process which takes place in the renal tubuli.

From all the data of pathological anatomy given it would seem that the changes in the vessel walls constitute one of the principal and characteristic lesions in glaucoma.



These lesions suffice to explain the passage of albumen from the blood to the aqueous. Arterio-sclerosis of the blood-vessels of the uveal tract and of the retina induces a narrowing of their calibre and causes a condition which may be called ocular dialbuminosis. As is well known, movement of albumen through the vessel wall depends largely upon the slowness of the blood stream, which in endarteritis is produced by the roughness of the epithelium of the inflamed vessels ; as a result there occurs a reduction of arterial and an increase of venous pressure, conditions, again, which are favourable for the filtration of albumen. The nervous system also plays a part. Dilatation diminishes arterial pressure and slows the blood stream. Thus may be explained the effect of shock and emotion on the precipitation of glaucoma and also the influence of the sympathetic nerve.

*Genesis of Glaucoma.*—Troncoso lays great stress upon pathological alterations of the vitreous in the production of glaucoma. The shallowness of the anterior chamber is due to an advancement of the lens and iris produced by a kind of œdema—an increase in the quantity of the vitreous. All the conditions necessary for the escape of albumen mentioned before must aid in changing the character of the vitreous. In the adult the nutrition of the vitreous depends solely on the retinal vessels. A nutritive stream arises from the retina and flows forward as is shown by the following facts: (1) The existence, in some normal eyes, of a sub-hyaloid fluid; (2) in the superficial coverings of the adult vitreous, principally about the papilla and the ciliary body, are encountered a great number of flattened cells with one or two nuclei, and formed of granulated protoplasm which are really migrated leucocytes; (3) the structure of the vitreous, composed of stratified layers radiating from the canal of Cloquet; (4) in old age the leucocytes of the superficial layers of the vitreous diminish notably, a proof that nutrition also is then impaired.

Following changes in the vessel walls in glaucoma the character of the stream changes and the vitreous is pro-

foundly affected. In glaucoma the intercellular spaces are completely closed by a thickening of the hyaline substance of the cells, and these contents are forced to accumulate between the lamellæ, where, not finding exit, they stagnate. In this way the increased size of the vitreous is accounted for. In advanced cases the vitreous has been found soft, in others impregnated by a yellowish liquid, which, on standing, deposits a yellowish coagulum.

If we admit the evident *rôle* of the vitreous all the symptoms are readily united. Either as a result of some systemic diathesis or of a localised endarteritis in the eye the vessel walls become permeable to albumen, retarding filtration out of the anterior chamber. When the secretion of the albumen reaches a certain point, the excretory passages, though still intact, become insufficient, and the intraocular tension rises until the augmentation of new aqueous equalises the tension within the vessels, when secretion of aqueous is checked. Somewhat before this the first symptoms of glaucoma appear. Such attacks are nearly always associated with some mental emotion, a reflex congestion of the veins of the head, with insomnia, &c., producing a vasomotor dilatation showing itself chiefly in the vessels of the ciliary body. These disturbances disappear with the causes that produce them, but when they reappear they become more severe. The increase in volume of the vitreous causes all the ocular signs, acting as it does on the diaphragm composed of the ciliary processes and lens. After several attacks the vitreous does not again become normal. Influenced by the albumen, all the tissues bathed in aqueous suffer a chronic fibrous sclerosis, a fine, fibrous, translucent membrane is formed covering the anterior surface of the iris, the pupil, the sclero-corneal edge, the meshes of which it fills, and extends over the surface of Descemet's membrane. A similar membrane can be produced experimentally, as will be seen later. The albumen irritates the papilla, producing congestion and inflammation before excavation appears.

In subacute and chronic glaucoma all the phenomena

are produced slowly; in absolute glaucoma the albumen is present in greater amount, and atrophy of all the ocular tissues ensues; in the hæmorrhagic form the disease of the vessels not only allows albumen to escape, but also blood.

(2) *Effects of Iridectomy, other Operations and Myotics in Inflammatory Glaucoma.*—Troncoso's views are as follows: Simple incision of the globe acts by allowing the albuminous aqueous and precipitates to escape. As ocular dialbuminosis is only transitory at first, one or two punctures may effect relief. Excision of a portion of the iris leaves an area which cannot be excluded by the root of the iris. After several attacks the iris becomes firmly adherent and the vitreous does not return to its normal volume, so that excretion becomes increasingly difficult, and therefore iridectomy is less satisfactory, and the only advantage to be gained by the operation is the increased facility for the fluids to pass from the posterior to the anterior chamber.

Anterior sclerotomy can never take the place of iridectomy, its action being only that of repeated paracenteses. The effect of posterior sclerotomy is transient. Resection of the superior cervical sympathetic ganglion cannot have a lasting effect. Eserin certainly pulls the iris away from the filtration angle, but its principal action consists in contraction of the ocular vessels, the quantity of blood is diminished, and therefore also the amount of albumen is decreased.

(3) *Simple Chronic Glaucoma.*—Under this and the following heading our review of Troncoso's paper may be more brief, as there is little to note. Excavation is caused by two factors, viz., tension and diminished resistance of the lamina cribrosa, the latter being most in evidence in chronic glaucoma. Amaurosis glaucomatosa may be due to some lesion of the central artery of the retina, for it is known that some forms of degenerative changes in the artery can produce typical atrophy of the optic nerve. In chronic glaucoma, if increased tension appears it is due to nutritive disturbance in the vitreous secondary to vascular sclerosis, which allow exudation of albumen. In simple

glaucoma the ciliary body participates only to a slight extent. Presence of albumen in the aqueous was shown chemically in the two cases examined.

(4) *Secondary Glaucoma*.—Of this there are two causes : (a) An increased difficulty in excretion of the ocular fluids due to presence of albumen or fibrin, and (b) mechanical obstruction of the filtration angle. These two factors may work separately or together ; may be simultaneous or successive. He mentions nine causes of secondary glaucoma.

(i.) Luxation of lens. Occlusion of the pupils is the cause of hypertension.

(ii.) Traumatic cataract. The chief factor is the filtration of the fluids loaded with albuminoid substance from the lens.

(iii.) Discussion of secondary cataract. In some cases tension is due to escape of vitreous into the anterior chamber blocking the exits ; in others to the difficulty of absorption of an aqueous tumour loaded with inflammatory products.

(iv.) Extraction of cataract. Secondary glaucoma is due either to adhesion of the iris or to blocking of the angle by exudation.

(v.) Delay in restoration of the anterior chamber after extraction of cataract. In such cases where plus tension appears the determining factor is adhesion of the iris to the cornea and increase in volume of the vitreous.

(vi.) Irido-cyclitis serosa. Here the secretion of aqueous is probably increased, as the anterior chamber is at first deeper than normal. Later, owing to changes in the vitreous the iris is pressed forward and plus tension results in some cases.

(vii.) Seclusion of the pupil acts mechanically only.

(viii.) Anterior synechiæ. The cause is two-fold : (a) Closeness of the iris to the zone of filtration, and (b) intercurrent inflammations, which increase the quantity of albumen.

(ix.) Intraocular tumour. The tumour produces venous stasis, and therefore a tendency to dialbuminosis, and as the tumour increases in volume it compresses the vitreous.

(5) *Experimental Glaucoma*.—Injections into the anterior chamber of the eyes of rabbits of a few drops of vitreous, into others of egg albumen, showed that hypertension always followed increase of albumen in the aqueous when the proportion was high enough. The injections produce two classes of phenomena: manifest hypertension and signs of reaction. The first must not be ascribed alone to the greater difficulty of excretion, since in those cases where tension was increased and reaction most intense the angle of the anterior chamber was preserved and Schlemm's canal with Fontana's spaces was open. The consecutive diminution of the anterior chamber shows, moreover, that there was no hypersecretion of aqueous to which to ascribe this tension. The signs of irritation were no doubt due in part to traumatism and were caused chiefly by the action of some substance affecting all the tissues about the anterior chamber. In the animal into which albumen was injected the reaction was more marked, and in the second injection staphyloma of the cornea resulted. The delicate membrane which covered the iris was probably due to coagulated albumen.

Lastly, the cycle of phenomena noted and the return of the eye to the normal indicate that when the albumen is eliminated the cause of hypertension is no longer present. The blue discoloration of the aqueous (due to pigment injected along with the vitreous and albumen, &c.) persisted longer in those eyes in which vitreous or albumen was injected than in those in which normal saline had been alone used.

J. GRAY CLEGG.

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**E. HERTEL (Jena).** On Paraffin Protheses in the Orbit. *von Graefe's Archiv für Ophthalmologie*, lv. 2.

The writer gives an account of a large number of experiments made on the rabbit to determine what was the best way of using paraffin so as to form a stump on which to place an artificial eye. He found that injection of paraffin (sterilised) with a melting point of 40° C. into the healed socket

after enucleation in the rabbit, while it caused very little reaction, failed completely to provide any sort of prominence which could act as a support for an artificial eye. Two rabbits died of embolus immediately after the injection was made, and with very soft paraffin this appears to be an actual danger. In a second series of experiments, Hertel started upon the principle of the operations of Mules and Kuhnt, using paraffin balls, or masses, with a melting point of about  $78^{\circ}$  C. These bodies, weighing about  $1\frac{1}{2}$  grammes, were in some cases inserted into Tenon's fascia after enucleation; in other cases slightly smaller masses were introduced into the scleral sac after clearing out the contents of the globe. The results with these masses of hard paraffin were very satisfactory, except in the case in which panophthalmitis was present at the time of the operation. In this animal the paraffin ball inserted into Tenon's space was extruded after a few days. The operation seems suitable for cases in which the conjunctiva and orbital tissues are normal, or nearly so. To determine whether the socket after enucleation could be improved by injection of paraffin with a high melting point, Hertel made a further series of experiments. A metal syringe provided with a jacket through which a stream of hot water circulates, was used to make the injections. Paraffin, with a melting point of  $60^{\circ}$  C., was well borne by the tissues. Some improvement in the socket was attained, but the results were not nearly so good as by the former method.

A valuable addition to this experimental enquiry is an account of the examination of the orbital tissues and the paraffin embedded in them in rabbits upon which the experiments had been performed from twelve to fifteen months previously. In the series in which a soft paraffin had been used the paraffin was found irregularly distributed through the orbital tissues between the different tissue layers. Evidences of old inflammatory reaction, more or less intense, were always present, and the paraffin was surrounded by a fibrous capsule. The paraffin masses were also to some extent invaded and penetrated by the

tissues surrounding them. In the cases in which hard paraffin was used for injection the paraffin had not spread so widely and formed more compact masses. The hard paraffin also showed less tendency to become absorbed. Hertel, apparently, is of opinion that paraffin does not remain absolutely unaltered in the tissues for an indefinite time in the way many writers have supposed.

J. V. PATERSON.

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EMIL BOCK (Laibach). Trachoma and Cupro-citrol. *Wochenschrift für Therapie und Hygiene des Auges*, vi. 16.

Citrate of copper is a fine light powder, green in colour, containing 35 per cent. of copper, with the formula  $\text{Cu}_2\text{C}_6\text{H}_4\text{O}_7, 2\frac{1}{2} \text{H}_2\text{O}$ ; it is almost insoluble, needing over 9,000 parts of distilled water, or 7,700 parts of salt solution, to dissolve it. v. Arlt, who introduced this substance in March, 1902, employed it first as a powder, but afterwards in the form of a 5 or 10 per cent. ointment, to which he gave the name cupro-citrol. The main advantages which are claimed for it in the treatment of trachoma are (1) that it is painless, so that the patient is not hindered from carrying on his employment after its insertion; (2) that the patient can be trusted with the use of the ointment himself, so that weekly or fortnightly visits to the surgeon are sufficient. Owing to the slow solubility of the salt its action is continuous, so that nothing is gained by more than two, or at most three, insertions a day. (3) As it causes no slough, like nitrate of silver, it is said that scarring is avoided.

As to the result of this treatment, Bock gives an analysis of 58 cases treated by himself. Of these, 38 cases were treated successfully, 11 without any definite result, and in 9 the treatment had to be abandoned owing to the irritation to which it gave rise.

He divides his cases into three groups: (1) cases of commencing trachoma; (2) older cases, in which the

formation of scars was commencing, mostly with pannus ; (3) very old chronic cases with secondary changes. All the 9 cases in which the treatment had to be abandoned on account of irritation belonged to the first group of recent cases, while in the second group of 22 cases, all but two showed a greater or less degree of success. The cases, therefore, which are especially suitable for treatment by cupro-citrol are those which are beginning to become chronic ; its beneficial effects on pannus are, it is said, particularly noteworthy. With regard to the length of time during which treatment should be continued, no statistics are offered, but only a general statement is made that it compares favourably with other methods of treatment. It will be seen that the claims made on behalf of the new substance are by no means sensational, and it would be interesting to hear the results of a comparative treatment with this salt and with protargol, a substance which is not mentioned in the paper here reviewed. For the class of cases in which it is indicated, however, it seems possible that the new substance may win a permanent place in ocular therapeutics ; at any rate, it seems worth a trial. In cases in which it gives rise to irritation it is recommended to replace it for a time by daily instillation of the more soluble substance "itrol" (citrate of silver).

A. HUGH THOMPSON.

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COPPEZ (Brussels). Jequiritol. *La Clinique Ophtalmologique*, January 25, 1903.

Regarding this recent addition to the therapeutic means at our disposal there have been numerous articles in various journals of late, since its introduction by Ehrlich. It has not been confined in its employment to trachoma alone by any means, but it is particularly in reference to its beneficial action on that disease that Coppez writes. Messrs. Merck supply jequiritol in four degrees of concentration in convenient flasks, hermetically sealed, and numbered according to strength from 1 to 4 ; each flask contains a cubic centimetre. The contents of numbers 1 and 2 give



rise to slight pain, if any, but before either of the stronger applications is used cocaine should be instilled; corrosive sublimate should not be used at the same time as it precipitates the albumose. Some observers have recommended that the use of jequiritol should at first be very tentative in every case, but Coppez, when he has decided to employ it, begins somewhat more boldly, thus: On the first day he introduces 10 milligrammes of No. 3, next day 20, on the third day 30, and on the fourth 40 milligrammes of the same concentration. On the fifth day he introduces 10 milligrammes of No. 4, and on the three following days rises by the same degrees as in the previous period. A definite reaction, somewhat painful for a few hours, is generally produced by this means about the third day. There is some pain, a good deal of swelling of the lids for a day, but the œdema does not spread to neighbouring parts; the glands are never swollen, and the cornea never loses its transparency; the discomfort is almost never so great that the patient refuses to continue the treatment. This treatment is, in Coppez's view, thoroughly beneficial, though he is not so enthusiastic on the subject as de Wecker; but in those frequent cases in which the patient comes for treatment on account of the recrudescence of a chronic trachoma, he finds the period of distress caused by the disease much curtailed by this preparation. In from ten to twelve days the exacerbation has passed by and the patient is able to undergo more "permanently beneficial" treatment, such as expression or electrolysis, which latter is preferred by Coppez to all other methods. This, it will be admitted, is not unlimited praise.

In other pathologically vascularised conditions of the cornea also Coppez has seen jequiritol do considerable good; for example, in a case of very severe interstitial keratitis in which one eye had already been lost by secondary glaucoma. In chronic conjunctivitis and in the remaining results of (non-trachomatous) conjunctivitis, too, jequiritol, used in weak solution and very cautiously, has much to commend it.

W. G. S.

PANAS. Amblyopia due to Electric Discharge. *Archives d'Ophthalmologie*, October, 1902.

F. TERRIEN (Paris). Prognosis in Visual Disturbance of Electric Origin. *Archives d'Ophthalmologie*, November, 1902.

Within the short period of two years Terrien saw forty-five cases of eye trouble following exposure to short circuit flashing. With a single exception all his patients (as was Panas' one case), were employés of the Paris "Metropolitan," and the short circuiting occurred either on the engine from breakage or mal-contact of the "interruptor," or on the permanent way from the careless use of tools, &c. In one case only did the current pass through the patient. In the others there was merely vivid flashing, usually at about 30 to 50 centimetres from the eyes. As might be expected the symptoms met with differed from those observed in cases of lightning injury: neither lens changes, retinal hæmorrhages, nor detachment were found in any of the cases. The symptoms recorded: erythema, superficial burns, blepharo-spasm, severe neuralgic pains in the head, diminished vision with contracted fields, point rather to the action of the heat and ultra-violet rays, and bring the cases into the group of so-called "electric ophthalmia." (Cf. OPTHALMIC REVIEW, vol. i. p. 308; vol. ii. pp. 106, 196.)

Many of the patients recovered in three or four weeks, but in a considerable number symptoms persisted for many months, and in three cases Terrien describes the visual defect as permanent. Beyond a slight and transient œdema of the circumpapillary area of the retina no ophthalmoscopic changes were observed except in one case. In the single exceptional case optic atrophy with almost complete blindness was seen to develop in the course of two months. This result is of interest, but it is unfortunate that other possible causes of the atrophy are not explicitly excluded.

Acute forms of conjunctivitis with photophobia and pains in the head following exposure to short circuiting

are common enough in large electrical works. I have known an electric engineer suffer severely for *four days* after exposure to short circuit flashing of a current of 10,000 volts. That functional symptoms lasting for many months should result from momentary flashing of a current the E.M.F. of which was generally 500 volts must, in my opinion, be ascribed to the Parisian nervous system and the recently introduced Workmen's Compensation Law.

So far as my enquiries go such severe cases as Terrien describes are unknown in London, although short circuiting is not uncommon on the permanent way of the "tube." Short circuits cannot, I believe, occur on the London engines.

W. W. SINCLAIR.

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LYDER BORTHEN (Throndhjem). *The Relations of Blindness to Leprosy.* Christiania: H. Aschehoug and Co., 1902.

In the year 1899 L. Borthen, in conjunction with H. P. Lie, published an important work on eye disease in connection with leprosy. It was based on the examination of 476 lepers at that time in the leper hospitals of Norway. It dealt with the matter from the statistical point of view, distinguishing the effects of the anæsthetic and nodular forms of the disorder, and in detail with the affections of forehead, lids, lashes, conjunctiva, episcleral tissue, sclera, cornea, uveal tract and lens. The section of the work written by Lie described the microscopic changes produced by the leprosy bacillus in the various tissues of the eye.

The present work is a sequel to the one above mentioned. It deals, mainly from the statistical point of view, with blindness in relation to leprosy. By the term blindness Borthen means not absolute loss of light perception, but practical blindness, namely, such impairment of eyesight as renders a person unable to guide himself by sight in good daylight, or to count fingers held at one metre from the face. He employed the latter test, and placed the

cases in three groups: the blind, the blind in one eye, and the not blind. The patients examined were the inmates of three leper hospitals, one at Thronhjelm and two at Bergen.

The total number of lepers was 277; males 116, females 161. Of the whole number, 12 per cent. were blind in one eye, 17 per cent. in both. The following statements refer to those who were blind in both eyes. The frequency of blindness, relatively to the number of persons, was just about equal in the two sexes. It was about twice as great in the nodular as in the anæsthetic form of the disease. In both sexes and in both forms of the disease it was greater in the later than in the earlier stages. Blindness was found earlier in the nodular than in the anæsthetic form, but in both was met with chiefly in the later decades.

Corneal troubles through lagophthalmus are not uncommon in lepers, but the blindness was not attributable to these conditions. It was associated in all cases with grave disorder of the uveal tract. A study of the patients who suffered from lagophthalmus, but who were not blind, showed that this condition was three times as common in the anæsthetic as in the nodular form of the disease, and that while it led in many cases to slight epithelial changes in the lower part of the cornea, in the majority the cornea was free from visible disturbance.

The greater part of the volume consists of a series of photographic plates, seventy-four in number, together with notes of each individual case. The photographs exhibit in a very striking manner the terrible disfigurements of the face and eyes which leprosy can cause. As the outcome of his researches, Borthen urges that the assistance of an ophthalmic surgeon should be secured for the inmates of all leper hospitals. His two volumes represent a large amount of painstaking work, and should be in the hands of all who have to deal with leprosy.

P. S.

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GINSBURG (Berlin). *Outlines of the Pathological Histology of the Eye.* Berlin : Karger, 1903.

This is a substantial volume of 480 pages, excellently printed and illustrated. The subject matter is divided into sections, each embracing a particular region, such as lids, conjunctiva, iris, retina; and to each section is prefixed a concise description of the normal histology of the part. Then follows, under appropriate headings, an account of the microscopical changes found in various diseased conditions, and the author has spared no pains to make this as complete and up-to-date as possible. Indeed, if we have a fault to find in this respect, it is that he has been almost too conscientious in ransacking recent literature, and too much inclined to stand aside, as it were, and let other authors state their views, so that there are portions of the book which suggest a *réchauffé* of the *Archiv* and *Monatsblätter* rather than a well-digested work of reference.

It is rarely, indeed, that we have been able to detect anything omitted, but in the section on senile cataract we find no reference to the stage of increased bulk of the lens, though that of shrinking is frequently referred to; in fact, the three and a half pages devoted to this section seem altogether somewhat inadequate, especially when compared with the twenty pages given to sarcoma of the choroid, where we are almost overwhelmed with minute histological detail.

We have nothing but praise for the author's drawings and the manner in which they have been reproduced by process in the text.

On the whole, although it is possible to find some points for criticism, the reader will find the book a storehouse of recent and well-arranged information on the subject of which it treats.

W. G. L.

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## OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

CLINICAL EVENING, MAY 7, 1903.

Mr. W. LANG, Acting President, in the Chair.

*Vafiadi's Instrument for detecting Feigned Amblyopia.*—

Mr. R. H. Elliot. The exhibitor stated that this instrument had been found of the greatest service in India in the examination of men in the Army who feigned blindness of the shooting eye, a common resource of those wishing to leave the service before their full time and still retain their chance of a pension. He had found it save a great amount of time with very little trouble. One of the objections to the instrument he had found to be the fixed inter-pupillary distance, which rendered the instrument useless for testing patients with either very wide or very narrow inter-pupillary distances. Another objection was that as the testing was done at a distance of only 13 inches the patient's accommodation came into the question. The instrument itself consisted of a rectangular box with two sight holes at one end, and at the other an arrangement for using different objects or colours. The sight holes opened into three tubes, contained within the box and extending from the one end of it to the other, having at the far end the test objects; two of these tubes lead directly straight from the sight hole to the test object, whereas the third tube led diagonally across the box from (say) the right sight hole to the left test object. In this way the patient could always see the two test objects but did not know with which eye he saw them.

In reply to the President's question as to whether he employed the ordinary red and green test, Mr. Elliot said it did not answer in India, as the men very soon got to know it and then it was most difficult to detect feigning.

Mr. Adams Frost pointed out that in the test employed by him red could be rapidly changed to green without the patient's knowledge, and thus the very fact that the patient knew the test would only lead to his destruction if he were malingering.

Mr. Beaumont said that a further disadvantage to the use of the instrument was that the patient could close the pretended blind eye when looking into the box and the observer could not readily see whether the eye was open or shut. Mr. Elliot, however, said this could be easily overcome in a military hospital, since if a man refused to keep both eyes open he would be reported as being unwilling to submit to the test and be credited with feigning whether he was or not.

*A New Portable Perimeter.*—Mr. G. Brooksbank James. This instrument was shown as an attempt to combine the virtues of the larger and more elaborate instruments of Professor McHardy, Mr. Priestley Smith and others, with greater portability. The whole instrument could be packed up into a small rectangular box about a foot long. The chin rest was separate from the arc, the arc itself made of aluminium and jointed, the supports for the chin and for the arc itself were made of brass tubing, and the distance from the chin rest to the arc was measured by a steel rod which could be removed after the distance had been measured; the lid of the box carrying the instrument when packed up acted as a firm stand for the pillar carrying the arc.

*Zonular Opacity of the Cornea.*—Mr. G. Hartridge. This patient, a woman aged 34, showed marked central opacities of each cornea. She attended hospital complaining of defective vision which had gradually come on during the last ten years. She gave no history of injury either mechanical or chemical, but stated that her sight began to get dim after the birth of her eighth child, at which time both eyes were somewhat inflamed. Posterior synechiæ were present in both eyes, and probably some choroidal trouble, though this had not been determined, since the vision was so defective. Right V. = finger counting at 1 metre; left V. =  $\frac{6}{60}$ . The tension in both was normal, and there was no marked anaesthesia of the corneæ.

Mr. Adams Frost considered from the very defective vision that there must be marked choroidal change, and stated that it was most unusual to find this condition of the cornea in any but a diseased eye.

The President agreed with Mr. Frost that it was probably secondary to iritis, and associated with choroiditis and cyclitis, and that it was scarcely likely to have been a primary affection of the cornea in such a young subject. He believed scraping the cornea would be attended with good results, but in the present case he thought a better result might be obtained by iridectomy, since the cornea was so much clearer above.

*Microphthalmos.*—Mr. G. W. Roll. The patient was a young man, aged 17, having a small cranium and a narrow and prominent upper jaw with highly arched palate. Both eyes were microphthalmic, but with no colobomata of iris or choroid, though there was some difference in the colour of the irides. Right eye, V. with + 15 =  $\frac{6}{60}$ ; left V. with + 15 =  $\frac{6}{60}$ . Under homatropine and cocaine the hypermetropia was estimated at 20 D., and in both eyes the optic discs were small and ill defined, as were the retinal vessels, and both

fundi were misty and pale. No other member of the patient's family was similarly afflicted.

The President said that only two days ago Mr. Tweedy had told him of a boy aged 10, who with a + 19 only obtained  $\frac{6}{18}$  V.; the eye was not remarkably small, and this case he considered to be quite unique. He said that cases of from 15 to 17 dioptries of hypermetropia were not uncommon where the vision was very defective, and even with correcting glasses they were not brought up to more than  $\frac{6}{36}$  or  $\frac{6}{24}$ . On one occasion, some years ago, he had operated upon a woman aged 55 for senile cataract in a microphthalmic eye, one cornea being 4 mm. in diameter, the other of moderate size (7 or 8 mm.), and the lens in the small eye was larger than the cornea.

Mr. Adams Frost asked whether the members present had had much experience of the effect of a mydriatic in such cases, as a few months ago he had had a patient with a microphthalmic eye into which he had put a single drop of homatropine and the patient had promptly developed glaucoma.

*Persistent Hyaloid Artery.*—Mr. J. H. Parsons and Mr. P. Flemming. Clinical Notes: The patient, an infant aged 6 months, had been brought to the hospital on account of a peculiar appearance in the right pupil; this eyeball was obviously small, but the cornea and anterior chamber were normal, with a regular pupil dilating but little under atropine and inactive to light. A grey-white reflex was observed in the pupil which on further examination proved to be due to a mass placed just behind the lens, on which numerous vessels could be detected; no red reflex could be obtained round the mass. The diagnosis was thought to rest between (1) pseudoglioma, (2) persistent fibro-vascular sheath, (3) true glioma. Absence of any signs of inflammation excluded (1), and no direct evidence of (2) being forthcoming the eye was excised on the supposition that it contained a glioma.

Pathological notes: The cornea and anterior chamber of the excised eye were normal. A fine strand was seen passing through the vitreous from the optic nerve to the centre of the back of the lens, at which spot it was surrounded by a lens-shaped mass of connective tissue; three ciliary processes crossed to this mass, having their tips in apposition with it. The eye was microphthalmic, having an antero-posterior diameter of 15 mm. Under the microscope this fibrous mass at the back of the lens was seen to indent the lens itself, of which the posterior capsule was thickened and wavy, without any obvious gap in the capsule. The persistent hyaloid artery was seen running into this mass behind; there was



only a single thin-walled vessel which could be traced through the vitreous to the optic nerve.

*Papilloma of the Conjunctiva.*—Mr. Sydney Stephenson. The patient, a man aged 48, showed in the right eye a strawberry-like growth of red colour projecting from the palpebral fissure at the outer part of the upper lid, and about the size of a small pea. On everting the upper lid the growth was found to arise from the upper tarsal conjunctiva a few mms. from the free edge of the lid. A smaller sessile growth similar to the first arose from the tarsal conjunctiva at the inner side. Several smaller growths of a similar nature were scattered about the semilunar fold and the inferior punctum. A papillomatous growth was also present on the right hand side of the hard palate, about half an inch from the last upper molar tooth. Microscopically the growth was a papilloma consisting of a mass of branching processes running in all directions, and each made up of strands of fibrous tissue with blood vessels. The free surfaces of the processes were covered with layers of stratified and cubical epithelium with a definite basement membrane.

The growths had been removed on three or four different occasions, but in each case they had recurred, and this, Mr. Stephenson thought, was due simply to imperfect removal, as he could not say whether the base of the growths had been cauterised.

*A Case operated on for Conical Cornea.*—Mr. A. Stanford Morton. The patient, a woman aged 32, had been first seen in 1880 when complaining of failure of sight for the previous ten years. Both corneæ were found to be very conical, and the vision of the right less than  $\frac{6}{60}$  and J. 1 at 2 inches; vision of the left less than  $\frac{6}{60}$  and J. 2 at 2 inches. Both were improved to  $\frac{3}{4}$  by  $-5$  D. A month after her first examination elliptical excision of the left apex of the cone was performed, and in May, 1881, the left vision with  $+2$  sph. was  $\frac{8}{8}$ . In January, 1881, elliptical excision of the apex of the right cone was performed and repeated shortly afterwards. In May, 1881, the vision of the right eye was  $\frac{8}{8}$  partly with sph.  $+2$ , with cylinder  $+2.5$ .

In February, 1901, vision right and left J. 1 at 12 inches, and, with correction,  $\frac{8}{8}$ .

Mr. Morton stated that the amount of scar was so slight that on one or two occasions he had sent the patient round a class of men to ask if they noticed anything amiss with the eye, and she had been passed by all of them without their having noticed any scar. In answer to a question as to how many cases he had operated upon by this method,

he said some twenty-three or twenty-five, and he intended to narrate the cases later. He stated that he had had some adhesions of the iris to the scar, and had had many beneficial results, as well as some indifferent ones. The operation in the present had been performed by a Graefe knife.

Mr. Adams Frost said he had for some time operated in the way just described, but of late had given it up in favour of the cautery, as he had found with the latter that there was less resulting scar. He cauterised the apex of the cone freely and repeated the operation by just puncturing at the apex, which he considered produced a greater flattening of the cornea than could be obtained by means of the knife.

Mr. Johnson Taylor asked whether Mr. Morton was in the habit of operating upon the area of greatest curvature.

The President said it would be interesting if someone would collect a number of cases of conical cornea which were improved by glasses without operation, since an enormous number of such cases could be greatly improved by using high convex cylinders, an observation originally made by M. Landolt.

Mr. Juler said he had operated upon a number of cases using a horizontal incision above, then seizing the lower flap with a fine pair of iris forceps, and cutting it away with scissors, but he had never experienced such a good result as that brought forward by Mr. Morton. He had found that very often the cornea, being very unhealthy, would not heal at all. He much preferred to use the cautery, since one could proceed by degrees, and he thought it better to make a fine puncture through the centre of the cornea with the knife.

Mr. Morton strongly advocated perforating the cornea, as he believed a much better result was thus obtained.

REGINALD E. BICKERTON.

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# THE COSMETIC VALUE OF PARAFFIN INJECTIONS AFTER ENUCLEATION OF THE EYEBALL.

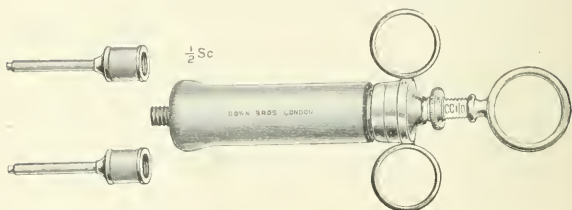
BY A. MAITLAND RAMSAY, M.D.

SURGEON TO THE OPHTHALMIC INSTITUTION, GLASGOW ROYAL INFIRMARY.

IN the *Lancet* of January 31, 1903, I published a note giving an account of my experience in twenty-two cases in which, after enucleation of the eyeball, I had injected paraffin for the purpose of forming a stump for an artificial eye. Since that date I have performed the operation twelve times, and as a result of the further knowledge thus acquired my method of procedure has been slightly altered. The patient having been placed fully under the influence of chloroform, the eyelids are separated and kept apart by a spring speculum. The conjunctiva is divided as close as possible to the corneal margin, each rectus muscle is caught up on a strabismus hook, and a strand of catgut, knotted at one end, is passed through the tendon and overlying conjunctiva, the knot preventing it from slipping. The tendons of the recti muscles are cut at their insertion into the sclerotic, and thereafter the operation for the removal of the eyeball is completed in the ordinary manner, great care being taken not to injure the capsule of Tenon. If adrenalin chloride solution be freely used the amount of bleeding is very slight, and any hæmorrhage is easily stopped by douching the socket with hot sterilised

water. The capsule is opened to its utmost capacity by holding the recti muscles on the stretch by means of the four catgut sutures. It is then packed with gauze moistened with adrenalin and a strong black silk purse suture is passed round its mouth. This done, the gauze packing is removed, and if the whole interior surface be dry the melted paraffin is injected. The paraffin used is a sterilised preparation, melting at  $104^{\circ}$  Fahr., specially made by Rogers of Oxford Street, London.

Formerly I employed an ordinary glass syringe, but Down Brothers have recently made for me a metal



one, the great advantage of which is that it has two side rings which enable it to be held firmly by the first and second fingers, while the thumb passed through the loop at the end of the piston regulates its movement with the greatest ease. The piston itself is graduated so that the exact amount of paraffin injected is known, and the fitting is so careful that the instrument works with the utmost smoothness. The barrel has a rubber jacket which acts as a non-conductor and keeps the paraffin from cooling too rapidly. The jar containing the paraffin is put into a water bath heated to about  $107^{\circ}$  Fahr., and the syringe, carefully sterilised and heated beforehand, is filled. The

nozzle having been inserted into the capsule of Tenon, and the suture drawn tightly round it, the sac is distended with paraffin, the nozzle withdrawn, and the suture quickly pulled tighter still so that none of the injected matter may escape. The ends of the silk thread are then securely fixed by a double knot, and the catgut sutures are tied, the superior rectus muscle being approximated to the inferior and the internal to the external. The paraffin is thus induced to mould itself in the socket, and to form a stump to which the divided muscles readily attach themselves. Any excess is wiped away, and, after the conjunctival surface has been carefully bathed with boric solution, a compress and bandage are applied.

The operation as thus performed is followed by more inflammatory reaction than when the continuous suture was tightened after the sac was filled to overflowing with paraffin ; but with care to gauge accurately the amount the capsule will hold, the discomfort is never so great as to keep the patient from sleeping. It must always be remembered that the paraffin shrinks on cooling and, consequently, although the sac seems fully distended immediately after the operation, the stump will not be nearly so large a fortnight later when all inflammation has disappeared. For several days after the operation the eye should be douched with a hot solution of trikresol (1 in 1,000), as this does much to lessen the inflammatory swelling and allay discomfort. The suture is kept in place for a fortnight, and when it is removed at the end of that time there will be found over the freely movable paraffin stump a clean non-discharging surface of conjunctiva. Three or four weeks later an artificial eye can be adjusted, the ordinary shell proving as

a rule quite satisfactory, though sometimes better results may be obtained from the use of the form recommended by Snellen. Care needs to be taken that this is not too large, otherwise the paraffin stump will move behind the prothesis. The best results are obtained when a plaster cast of the socket is taken and the glass specially made to fit it. To insure success two points require special attention: first, the operation must be carried out with every precaution against sepsis, and so it must not be attempted in cases where the eyeball is in a state of active suppuration; and second, the sutures must hold the conjunctiva in accurate position over the paraffin. It is on the purse suture that most reliance requires to be placed, and it is therefore very important to see when this is introduced that an equal grip is taken of the conjunctiva all round the free edge, and also that too wide an interval is not left between the stitches; but the catgut strands to which the muscles are attached afford great additional security.

In my series of thirty-four cases the paraffin has three times come out through inefficiency of the stitching, but in two of these the conjunctiva was simply drawn together by the catgut holding the muscles without any continuous suture. The purse suture was introduced in my fourth case, and since then only twice have the stitches given way. In one of these the suture securing the internal rectus muscle broke, and a little opening made its appearance, on the seventh day after the operation, opposite the attachment of that muscle, and the aperture grew gradually larger and larger until the paraffin escaped. In the second an opening appeared and the paraffin remained exposed for six months without coming out. At the end of that time, as the patient complained of pain,

a slit was made in the conjunctiva, and the artificial stump shelled clean out, leaving the socket perfectly healthy. On one occasion, after the enucleation of a suppurating eyeball, pus appeared and set up so much inflammatory reaction that the stitches were removed and the moulded paraffin was allowed to escape. Once sympathetic inflammation followed an enucleation and injection; but I do not think that any blame can be attached to the paraffin. The case was one of septic wound of the eyeball in which after enucleation the optic nerve was found to be acutely inflamed. Strict antiseptic precautions were taken at the time of the operation and the socket healed up in a perfectly satisfactory manner. Nevertheless the amount of previous sepsis was a contra-indication, and, apart altogether from the question of sympathetic disturbance, I would not again use paraffin under similar circumstances.

The case in which the stump was removed six months after the operation proves that the paraffin simply lies in the tissues and gives rise to no irritation. The mass that shelled out was a perfect cast of the socket, and microscopic examination showed that there was no incorporation with the structures surrounding it.

I am more than ever satisfied with the cosmetic results. The advantage is not so much in the greater mobility of the prothesis as in the minimising of the flat sunken appearance of the upper lid which nearly always follows simple enucleation.

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## REVIEWS.

HÀLA (Prague). On the Individuality of the  
 "Coryna-bacteria." *Zeitschrift f. Augenheilkunde*,  
*Bd. ix., February and March, 1903.*

Under this designation the "club-forming" bacteria—introduced by Lehmann and Neumann—is included the composite group of diphtheria, pseudo-diphtheria, and xerosis bacilli. It must be admitted that the relations of the members of the group to one another are not at present scientifically determined, and Hàla has made an exhaustive investigation of the subject from this point of view. Experiments on animals are able to settle whether we have to deal with a strongly virulent form; but if not, our present methods fail to distinguish between non-virulent diphtheria bacilli and the pseudo-diphtheria bacilli (including xerosis bacilli). It is impossible to distinguish by size and segmentation between bacilli from cases of typical xerosis and of typical lethal diphtheria. For example, virulent diphtheria bacilli, cultivated on sloped glycerin-agar for four months, showed giant club-shaped bacilli identical with the chalazion bacilli of Deyl (xerosis bacilli) and the blood serum cultures of xerosis bacilli by Heinersdorff. Gelpke's dictum that diphtheria bacilli scarcely stain at all by Gram's method applies only to his cases, and is not of general application. It is not universally true that xerosis bacilli grow more profusely on Löffler's blood-serum than diphtheria bacilli. Whilst pseudo-diphtheria bacilli retain their vitality longer in bouillon than diphtheria, the mode of growth is not always diagnostic.

It has been shown by Eyre that, in the early stages of growth, there is no acid formation by xerosis bacilli, whilst this is invariable by diphtheria. Axenfeld proved the unreliability of this distinction for diagnostic purposes, and these results are confirmed by Hàla, though the English author is not quoted.

As regards virulence, Koplik has recorded an important



observation. Virulent diphtheria bacilli were obtained from the lacunæ of the tonsils of a child; three weeks later masses of bacilli, morphologically identical with the others, were found which were non-virulent even in large doses. They were slightly larger and thicker, made bouillon cloudy in forty-eight hours, and grew profusely on agar, forming white colonies.

Baumgarten and others have stated that xerosis and pseudo-diphtheria bacilli are quite indifferent, and in no manner virulent, to the organism. Hàla, in a series of inoculations into the sub-conjunctival tissues, and into the delicate tissue of the pinna of the ear musculature in rabbits, obtained abscesses; the same occurred with dead cultures of xerosis, but scarcely at all with dead diphtheria bacilli. No great stress can be laid upon these experiments.

Hàla confirms the results now arrived at by the majority of observers, that the Ernst-Neisser polar staining is not reliable. All that can be said is that it occurs slightly earlier with diphtheria bacilli.

The general conclusion is in favour of the fundamental identity of diphtheria, pseudo-diphtheria and xerosis bacilli.

J. HERBERT PARSONS.

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#### A. HAEMERS (Ghent). Regeneration of the Vitreous. *Archives d'Ophtalmologie*, February, 1903.

In considering the regeneration of the vitreous, it is necessary to take into account the manner in which it is formed.

Three theories have been advanced concerning its origin: (1) The mesodermic theory outlined by Schöler, elaborated and modified by Kölliker; (2) the vascular theory of Kessler; (3) the retino-ectodermic theory, put forward by Professor Tornatola some years ago.

M. Haemers has come to the conclusion that the last

is the correct one, and refers to a previous paper<sup>1</sup> for fuller details. Shortly he found, when studying its genesis in various embryos, that the vitreous originated in a homogeneous layer, which received filaments from the capsule of the lens and from the secondary optic vesicle. Thus he considers that the vitreous is of a retino-ectodermic origin. In studying its regeneration he used two methods, the first of which consisted in partially evacuating the vitreous after extraction of the lens; the other, in removing some of it by an incision in the equatorial region of the globe. This latter method allowed ophthalmoscopic examinations to be practised.

The microscopic analysis of an eye so treated and enucleated after several days presents two points of view for examination: (1) The state of the vitreous persisting after the partial evacuation; (2) the elements, new or of late formation. The old vitreous remaining after the evacuation is found chiefly in the ciliary region and about the ora serrata. The meshes of the reticulum contain no fluid, which has probably disappeared under the manipulations to which the eye has been subjected. The fibrils become sound and smooth, their affinity for chromatic substances becomes increased, in short, they seem to throw back to their embryonic characters. The normal cellular elements completely disappear; instead, numerous small elements with a large nucleus and little protoplasm are found. Contrary to the ideas of Duke Charles of Bavaria, and of Milles, no karyokinetic element is found. The fibrillary tissue may form, by condensation of the filaments, a membrane-like structure, or a sac, in which is a granular mass. The fibrils have an intimate connection with the fibrils of Müller in the retina, from which they seem to spring.

The newly-formed elements in such eyes were found to be either a reticulum with a granular substance, or vesicular elements. The reticulum is formed by filaments arising from the surface or deeper parts of the retina.

<sup>1</sup> *Archives d'Ophthalm.*, T. xix., p. 268.

The granular substance is formed from lymphocytic cell elements analogous to those found in the true vitreous which remains. The vesicular elements, which appear to come from the deeper layers of the retina and have no connection with the vessels, are found chiefly about the equator of the eye and in the ciliary region. Rarely are they found in the posterior segment of the globe. They probably come from the neuroglia by secretion.

In conclusion, this paper seems to show, amongst other things, that repair of the vitreous is brought about by exoplasmic products at the expense of the supporting tissue of the retina, and the newly-formed vitreous elaborates itself at the expense of the retinal neuroglia.

FRANK C. CRAWLEY.

**ZUR NEDDEN (Bonn).** Conjunctivitis caused by the Influenza Bacillus. *Klinische Monatsblätter für Augenheilkunde*, March, 1903.

The first occasion on which Zur Nedden succeeded in proving the presence of the pseudo-influenza bacillus to be a cause of conjunctivitis was in 1899, and though even for some time after that date eye complications of influenza were frequently enough noted, it was only later, after adopting different culture media, that the true influenza bacillus was found to be present in certain cases of conjunctivitis, and indeed not without considerable frequency. Jundell, of Stockholm, described eight cases in which he found the influenza bacillus to be the cause of conjunctivitis in infants; these occurred during an epidemic of influenza. In the majority of them the symptoms were trifling, though one case, on the other hand, was very severe; and in them all the sputum as well as the conjunctival secretion contained the influenza bacillus, sometimes in pure culture.

From the first Zur Nedden observed in his own cases that fever, coughing, and nasal discharge were accompaniments of the existence of influenza bacillus in the

conjunctiva; in some at least it was probable that the bacillus had first obtained foothold in the conjunctiva, and had thence spread to the respiratory passages. In his paper he next gives a clinical and bacteriological account of ten more cases in which he was able to prove the presence of that micro-organism. As regards bacteriology, it is enough to say that not only was the influenza bacillus easily demonstrated and readily cultivated from them all, but this was the only germ common to all the series of thirteen cases, and any others (Staphylococci, Streptococci and Pneumococci), when present at all, were so very few in number that they could not be regarded as influencing the diagnosis at all. Clinically, the conjunctivitis was not severe, but the discharge of a rather thin fluid was somewhat copious; the anterior portions of the bulbar conjunctiva were hardly affected, and the cornea never at all, the disease practically confining itself to the conjunctiva of the lids and the *cul-de-sac*.

As regards the question of prognosis, one must recollect that though the local ailment is not dangerous, and is amenable to treatment, yet such complications as bronchitis are often present, and may be dangerous. Rhinitis, dacryocystitis, and otitis media are naturally somewhat frequent. These may all be coincident affections, it is true; but in certain cases may they not be secondary to the lesion of the eyelid? If so—and Zur Nedden believes that he was able to demonstrate that in one or two instances the ocular affection was the primary seat of the affection—then the disease cannot be regarded as quite so trifling a matter, either as regards the patient himself or his neighbours. The great majority of these cases seem to occur in young children or infants, but in a few instances adults have been attacked; it appears to be the case, too, that the younger the child the more severe is the attack likely to be; adults seem to “get off” very easily. Possibly certain cases of ophthalmia neonatorum may be in reality examples of conjunctivitis due to the influenza bacillus; a bacteriological examination ought to be made in order to determine the point. The duration

of the disease is about from ten to fourteen days on an average. Nitrate of silver (2 per cent.) gives the best result in the way of treatment, every one of the more recent preparations being, in Zur Nedden's opinion, far inferior in efficiency. Of oxycyanate of mercury (1—1,500) he speaks well also. The remainder of Zur Nedden's paper deals chiefly with technical details as to the cultivation of the organism in question.

W. G. S.

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SCRINI AND BOURDEAUX. Essential Intra-ocular Hæmorrhage. *Archives d'Ophtalmologie*, March, 1903.

Two characteristic cases of spontaneous relapsing intra-ocular hæmorrhage in healthy young men are in the first instance recorded. The first patient had had attacks of epistaxis when about 19 years of age; his father and an aunt had suffered from cardiac mischief. His left eye was the more seriously affected; in it a development of vascularised connective tissue on a plane anterior to the retina was observed, when the blood finally cleared from the vitreous. In the right eye was found a pigment patch occupying the outer layers of the retina in a peripheral part of the fundus, which the authors considered to be of hæmorrhagic origin; the inferior retinal vein of this eye was noted to be dilated and varicose. In the second case both eyes were seriously involved; intramuscular injections of cyanide of mercury had been previously tried in this patient, and had very readily induced diarrhœa with blood in the stools. Some segments of tapeworm were observed to have been passed, and a vermifuge had caused the evacuation of the parasite, but it was not certain that the head was expelled. Good vision was eventually recovered in the right eye; in the left a proliferating retinitis was recognised when the vitreous cleared. The authors draw attention to the fact that retinal hæmorrhages have been detected by various observers in patients rendered anæmic by the *Ankylostoma*

*duodenale* and *bothriocephalus latus*; in this patient, however, no anæmia had been induced by the tænia.

The history of the earlier ophthalmoscopic observations of intraocular hæmorrhage, and the various attempts at their classification which have been suggested, are next reviewed by the authors. Eliminating all cases for which a local cause or a general constitutional disease can account, the authors think there is still room for a class which they describe as "essential and recurring;" these cases are most often met with in vigorous young males between the ages of 15 and 30, in whom both eyes are usually affected but often to different degrees. They arrive at the conclusion that as a rule it is from retinal veins that the blood is poured out, but admit as another possible source the vascular tunic of the eyeball in its ciliary portion beyond the ora serrata.

The hæmorrhages are recognised to vary in volume, in rapidity of development and in duration. According to the author, Abadie is the only observer who has had the opportunity of watching the bleeding into the vitreous in actual progress.

In cases of spontaneous hæmorrhage the blood may occasionally become absorbed and leave no trace, or a pigmented area in the retina may be left to indicate the site of one of the retinal extravasations; more commonly a white connective tissue, often vascularised, organises in the degenerate vitreous humour.

As to ætiology the authors say, "Hæmorrhages occurring in young people are called essential because they are young, but it does not follow that it is because they are young that they are liable to hæmorrhage." They have shown that typical cases of this class have occurred in patients up to 30 years of age (and even beyond), in whom no senile vascular condition was present; they therefore wisely reject the theory that the onset of puberty can have any influence. Examinations of the blood gave them no clue as to causation. They elaborate the views of the late Prof. Panas and attribute a large share in the ætiology of these cases to auto-intoxication; they believe

that toxic products of irregular metabolism will influence the vessel walls, the heart, the blood and the sympathetic nerve system; Panas has suggested as responsible for baneful toxines such causes as defective development of the organism at the age of puberty, chronic rhinitis, dyspepsia and dilatation of stomach, alcoholism, &c. The authors allude to the influence of certain albuminoids in preventing coagulation of the blood, and to the great frequency of varicose degeneration of veins in the gouty, a class of persons who may be considered to be the subjects of chronic auto-intoxication.

Their conclusions are as follows :—

That a person the subject of a constitutional defect, either inherited or acquired, may under ordinary conditions rise superior to a disorder in digestion, assimilation, or glandular secretion; but such disorders will lead to changes in his blood vessels either locally, as in eyes, nose or lower limbs, or generally, if he be at the same time endued with a tendency to vascular degeneration; the above two conditions being fulfilled, in the presence of a temporary or permanent alteration of the blood, or if local congestion occur (such as heat, posture, or in the case of the eye, accommodative efforts may produce) spontaneous hæmorrhage may be expected to occur.

In the matter of prognosis and treatment nothing very new or reliable is suggested. The article is a careful and useful *résumé* of the subject of which it treats; as might have been feared, the conclusions arrived at are not very convincing, and mark no great step in advance.

J. HERBERT FISHER.

J. GONIN. The Ophthalmoscopic Appearances of Hæmorrhage into the Optic Nerve Sheath. *Annales d'Oculistique*, February, 1903.

On reviewing the clinical record of cases one finds that there are four different appearances considered to be manifestations of hæmorrhage in the optic nerve or its sheath. There are :—

(1) *Retinal ischæmia*, with more or less complete efface-

ment of the vessels and a milky turbidity at the posterior pole of the eye similar to that commonly attributed to embolus.

(2) *Extravasations of blood* near the papillary border or in the macular region, in addition to a more or less prominent ischæmia of the retina.

(3) *An extensive effusion of blood* starting from the border of the optic papilla and extending forwards into the vitreous, in some cases to such an extent as to present the appearance of a profuse intraocular hæmorrhage, eventually leaving a so-called "retinitis proliferans."

(4) *An optic neuritis* or stasis papillaris, as in the case of hydrops of the sheaths.

In twenty-four cases of sudden blindness associated with retinal ischæmia which have been examined anatomically and described accurately by various writers, there is not one which showed as a cause hæmorrhage into the nerve or its sheaths. There is therefore no anatomical confirmation for the view that hæmorrhage into the nerve or sheaths can produce the effects ascribed to it.

Gonin now proceeds to enquire whether such an assumption is probable from theoretical considerations. He propounds the following questions, and discusses in detail their answers:

(a) Can a hæmorrhage in the optic nerve or its sheaths be a cause of total and sudden blindness in the same sense as an obstruction of the central artery? Experimental injection has failed to produce it. It is impossible to conceive of an extravasation having such force as to tear the nerve fibres when the largest vessel that could be a source of supply is so small as the central artery. Total and sudden abolition of function in the nerve has only experimentally been produced by ligature.

(b) Is apoplexy of the nerve of such a nature as more rapidly to produce retinal haze than embolism? Magnus believed that the immediate cause of turbidity is a lesion of the nerve fibres, because it followed in some hours after section or ligature of the optic nerve, but Leber (clinically) and Wagenmann (experimentally) have shown



that a lesion of the nerve is not accompanied by opacity of the retina when the vessels are not affected. The turbidity therefore results from the ischæmia. There is no reason to suppose that ischæmia produced by compression would cause retinal turbidity more rapidly than ischæmia by any other cause.

(c) Does the hypothesis of an apoplexy of the nerve permit a plausible explanation of the temporary obscurations of vision that precede complete blindness in many cases usually attributed to embolism? Can it also be in accordance with the fact often observed of a rapid return of the retinal circulation to its normal state? Magnus not having succeeded in provoking a marked modification of the retinal vessels by forcible injection, it is not right to assume that small hæmorrhages in the nerve can effect even temporary obscurations of vision. It is still more difficult to understand re-establishment of the circulation and vision after a lapse of hours or days if, as some authors state, the nerve fibres are torn or the extravasation is abundant enough to compress the nerve and its arteries; nor yet is it probable that shrinkage of the clot in a few hours will account for it.

(d) Is it probable that peripapillary hæmorrhages form a frequent sign of effusion into the sheath? There exists no direct communication between the intervaginal spaces and the intraocular cavity. Experimental injection has failed to establish such a path, and in a case of metastasis pneumococci have been found in great numbers in the sheath spaces, and yet there was no direct propagation into the interior of the eye.

(e) Is the frequency of spontaneous hæmorrhage in the optic nerve comparable to that of the causes of obstruction in the lumen of the artery? Spontaneous hæmorrhages are exceedingly rare, in spite of the assertion of Magnus that most cases said to be embolism are of this nature. Hæmatoma of the optic sheaths is almost always of extraorbital origin.

Lastly, in none of the nine recorded cases of hæmorrhages in the optic nerve confirmed by examination at

the autopsy, did the ophthalmoscopic appearance suggest embolus; usually the visual troubles were not determined owing to the unconscious state of the patient. The only external manifestation of an apoplexy in the sheaths has consisted in a slight degree of papillary stasis, with or without hæmorrhages, along the retinal vessels.

Gonin's conclusions therefore are that :—

(1) The appearance, in an eye which has suddenly become blind, of milky turbidity in the papillo-macular region, with more or less complete ischæmia of the retinal arteries, does not by any means authorise the diagnosis of hæmorrhage into the optic nerve or its sheaths.

(2) There is no more reason to conclude that there is an apoplexy of the sheaths when hæmorrhages are found at the margin of the disc or in the vitreous. Hæmorrhages really accompanying intravaginal extravasations have no special characteristics.

(3) A slight degree of stasis is the only ophthalmoscopic disorder which the known facts warrant us in regarding as a sign of retro-ocular bleeding.

(4) The absence of ophthalmoscopic signs does not suffice to exclude the possibility of even a large hæmorrhage in the optic nerve sheath.

(5) One is still ignorant of the subjective visual effects of a hæmatoma in the sheath when that condition is not complicated by more serious lesions, such as an osseous fracture or a cerebral hæmorrhage.

The above conclusions are entirely opposed to the statements of Magnus and de Wecker.

J. GRAY CLEGG.

C. FROMAGET (Bordeaux). The Measurement of Refraction by Scheiner's Method (Ametropometer of Méhauté). *Annales d'Oculistique*, March, 1903.

(1) DESCRIPTION OF THE AMETROPOMETER.

The construction of the *optometer* is based on Scheiner's experiment, and its object is to permit of a simple and rapid measurement of the static refraction without refer-

ence to the visual acuity. In Scheiner's method an individual has no diplopia of an object at infinity because of the superposition of the retinal images; but a myope experiences homonymous diplopia, and a hypermetrope, crossed diplopia. The ophthalmoscope which is used as an optometer is a modification of Kalt's, and it is provided with a clip adjustment to enable it to be accurately placed in the aperture of a suitably adapted spectacle-like frame, or "optometer-carrier" as it is termed. The ophthalmoscope is furnished with a Scheiner's optometer contained in the central aperture of a disc graduated from  $0^{\circ}$  to  $180^{\circ}$ , and so arranged that the small holes, covered with a red and green glass respectively, can be placed in any meridian. This disc replaces the ophthalmoscope mirror when it is desired to use the ophthalmoscope as an optometer to measure refraction. The *optometer-carrier*, which is placed on the face like a trial frame, consists of plane black surfaces notched for the nose and of sufficient size to extend from the brow to the malar bone. It is provided with two large elliptical apertures for the eyes, furnished with sliding obturators. When *in situ* it forms a dark chamber for each eye, does away with the use of hands or bandages, and leaves absolute liberty of movement. There are suitable thumb screws on either temporal side in front for fixing the optometer to the optometer-carrier before the right or left eye; and above each eye-aperture there is a graduated scale to enable the optometer to be centred accurately to each of the patient's pupils.

The *optometer lantern* is furnished with a Maréchal burner giving an intense light. The lantern is of cylindrical form and is provided with a reflector behind and two discs in front, the one forming a luminous rectangle and the other a luminous cross. The reflector is a concave mirror of 90 millimetres focus and the centre of the flame coincides with the focus of the mirror, so that the whole surface of the disc in use shall be brightly illuminated. The disc with a central rectangular opening gives a light of definite form in any meridian. It is of copper, and the aperture is filled with ground glass upon which glide two metallic

plates with parallel borders, by the separation of which a more or less narrow rectangle can be uncovered. The disc can be rotated in the aperture of the lantern, which is graduated from  $0^{\circ}$  to  $180^{\circ}$ , so that the orientation can follow the diameter perpendicular to the meridian being tested, and correspond to that of the optometer. If the horizontal meridian, for example, is being examined, the luminous slit should be placed vertically. The disc forming a luminous cross is pierced with numerous holes arranged along two lines, the one perpendicular to the other. To determine precisely the direction of the two principal meridians the cross is shown in any position. The patient observes that all the apertures are distorted and elongated in the same direction, and one of the arms of the cross is then placed in the direction indicated. One meridian then appears in the form of a continuous luminous line and the other in the form of short lines, parallel to the first and to each other, giving a ladder-like appearance. A circle of white paper is placed behind the disc to improve the clearness of the images.

## (2) METHOD OF USE.

In using the ametropometer the patient is generally placed 5 metres from the luminous source which should be at or about the same level as the eye under examination. In placing the luminous source nearer there is no appreciable error, for the accommodation enters into the case only to a negligible amount. To obtain good results the illumination must be very bright.

*Measurement of Myopia and Hypermetropia.*—The branches of the luminous cross are seen quite clearly. The eyes, covered with the optometer-carrier, look through the two holes, furnished with red and green glass respectively, at the luminous rectangle, the direction of which should be perpendicular to the meridian which it is desired to test. If the eye is emmetropic only a single rectangle will be perceived, and convex or concave lenses will produce homonymous or crossed diplopia. If the eye be ametropic there will be diplopia, and a red and green rectangle will

be seen, the images being further removed the greater the ametropia. If the diplopia is homonymous the case is one of myopia, and if crossed it is one of hypermetropia. The patient himself holding the optometer, the surgeon turns the ophthalmoscope wheel to bring correcting lenses rapidly before the eye, and stops when the two images merge into one another. Sometimes the two images do not merge exactly, one lens giving a red border to the right, and the next lens a red border to the left. In this case the correcting lens is between the two.

*Measurement of Astigmatism.*—The two principal meridians are determined in the manner already described, and the refraction in them is measured. The Scheiner optometer is placed in the meridian under examination and the luminous rectangle at right angles. The astigmatism thus determined is the total astigmatism.

### (3) ADVANTAGES.

For children, illiterates, and malingerers, this method of Scheiner is a great advantage over the method of Donders. The ametropometer produces a diplopia which is evident to anyone, it gives an exact measure of the refraction, and the measurement is made more rapidly than by the method of Donders, as well as being more exact. The latter has the one advantage of giving the measure of the visual acuteness.

Skiascopy is the objective method *par excellence*, but it requires practice and skill, and it takes considerable time in the hands of those who are not accustomed to it. With the ametropometer there is no necessity for special instruction or daily practice.

The estimation of ametropia by the erect image is a procedure which only oculists can adopt, and it is inexact, especially in myopia and myopic astigmatism.

The method of Scheiner is a complement to the method of Donders and skiascopy, and it yields the two important advantages of simplicity and rapidity.

L. VERNON CARGILL.

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GOULD (Philadelphia). Biographic Clinics. London :  
*Rebman*. 1903.

The idea before the mind of the author is a good one ; to try to discover from the memoirs of certain literary men and others who laboured under ill health what it was about them which caused the bad health from which they suffered. Of course anyone who knows anything of Dr. Gould will not be left long in doubt as to the nature and seat of the malady which he is quite sure to discover. He chooses five men almost at random, namely, De Quincey, Carlyle, Darwin, Huxley, and Browning, and is quite convinced from the study of their "lives," from which he gives copious extracts, that eye-strain lay at the bottom of De Quincey's erratic habits, of Carlyle's ill-temper and of Darwin's sea-sickness. Indeed, one rises from a perusal of his interesting little booklet with the impression that eye-strain may and does cause not merely almost every bodily ailment, but even mental and moral errors also, and that possibly, nay, well-nigh certainly, if Adam had only taken Eve in good time to a thorough refractionist (Philadelphia, of course), she would never have suffered from that persistent sinking feeling at the pit of the stomach which caused her to desire the forbidden fruit, and that lack of power to inhibit impulses which led her to take that—"Whose mortal taste brought death into the world and all our woes, with loss of Eden." Gould has done good work in its way, but it is spoiled by that warping of judgment produced by approaching a study with a mind occupied by a preconceived idea which has been allowed to run riot. Did the great man suffer from pains in the head and eyes? Eye-strain quite clearly. Had he absolutely no eye-pain but irritability of temper and a tendency to emesis after many hours of correcting proof sheets? Well, we know that eye-strain may produce *Fernwirkung*; therefore this is an indubitable case of eye-strain. *Q.E.D.* In short, Gould's book is very interesting and throws a new light upon the life story of certain of the giants of our day; were it not so one-sided it would however be more convincing.

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LAWSON. Diseases and Injuries of the Eye.  
*London : Smith, Elder and Co.*

This is the sixth edition of a familiar work, but deserves special recognition, inasmuch as by reason of its having been practically completely rewritten and immensely added to it has become to all intents and purposes a new book. No fewer than one hundred and fifty new illustrations have been added since the fifth edition was published in 1885, and in every way it has been enlarged and brought up to date. There are a hundred and twenty more pages, and each page is twice the size of that in the earlier issue. In short, the relation between the two is analogous to that between the chrysalis and the butterfly. This has largely been the work of Mr. Arnold Lawson, who also signs the preface, though the egg was originally laid by Mr. George Lawson. A feature with which the author is evidently somewhat well pleased is a very elaborate, and to tell the truth, somewhat involved and needlessly complicated, index.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED  
 KINGDOM.

ADDITIONAL MEETING OF THE SOCIETY, MAY 8, 1903.

Mr. LANG, Acting President, in the Chair.

CASES AND CARD SPECIMENS.

*A Case with Multiple Deformities of the Eye and Eyelids.*—Mr. R. W. Doyne. The patient, a female child, aged 2, presented in the right upper lid at the junction of the inner with the outer two thirds, a deep triangular cleft. Occupying the position of the inner canthus, and running downwards and inwards, was a second cleft. Both puncta were present and patent. A coloboma of the iris and a coloboma of the choroid, both down and in, were also present. Between the inner canthus and the nose, in the somewhat extensive interval between the two, a large elastic swelling was apparent, which was the distended lachrymal sac. This portion of the face was wide as compared with the other side. The right side of

the nose and the right nostril were both dwarfed, the latter admitting the end of a hair pin only. Pressure on the right distended lachrymal sac caused a flow of muco-pus from the puncta and from the right nostril. A highly arched palate was also noticed.

*A Case of Microphthalmos with Double Coloboma of the Irides.*—Mr. R. W. Doyne. This patient, a girl aged 13, showed small corneæ, measuring about 9·5 mm. in diameter, with nystagmus, a coloboma of the right iris inwards, and of the left iris upwards and inwards, together with opaque striæ in the right lens and a wholly opaque left lens. The tension of each eye was normal. The child was not very bright mentally, and the vision had always been defective. At the present time the vision is (R.) fingers at 1 metre and J. 16 : (L.) hand reflex only and less than J. 20.

#### PAPERS.

*A Contribution to the Study of Rheumatic Iritis.*—Dr. A. Paine and Dr. F. J. Poynton. This paper dealt with rheumatic iritis simply as one of the local manifestations of a disease, rheumatic fever, caused by a micro-organism in the same way as pericarditis, arthritis, endocarditis, pleuritis and subcutaneous nodules are caused. Pointing out in the first place that some divergence of opinion existed as to the frequency and occurrence of acute rheumatic iritis, the writers gave it as their experience that though it was a rare event it did occasionally take place, and cited the case recently published in the *British Medical Journal*, by Mr. F. C. Forster of Lowestoft, in which the patient, a girl aged 12½, after a definite chill developed tonsillitis and arthritis, later chorea, and later still iritis in the right eye and endocarditis, the iritis relapsing twice. The whole object of the paper was to show that acute iritis might result in rabbits from experimental inoculations with a diplococcus or micrococcus, which is a cause of rheumatic fever, the inoculations being intravenous and not local into the eye.

Two cases were recorded. In the first a boy, aged 9, suffering from cardiac disease, developed while under observation active rheumatism with arthritis, pericarditis, and subcutaneous nodules, death resulting from pericarditis; from the clear pericardial fluid minute diplococci were isolated, which in films of the pericardial fluid were found to grow in chains.



Of a series of nine rabbits inoculated with the pericardial fluid one developed iritis which in no way resembled septic panophthalmitis. From the fluid in the anterior chamber of this eye the micro-organism was again readily grown, and caused chronic arthritis when inoculated into another rabbit.

In the second case a boy who had suffered two years before from rheumatic fever died from mitral and aortic disease. General pericardial adhesion, with malignant mitral and aortic endocarditis, and a splenic infarction were found at the pathological examination. There was no suppuration. Two hours after death a minute diplococcus was isolated from the cardiac valves. Intravenous inoculations were made in five rabbits; one developed mitral endocarditis with iritis, three peri- and endocarditis, and one recovered. Hence from a series of fourteen rabbits inoculated, only two developed iritis, yet all developed signs of rheumatism. The writers regretted that there was still a great gap left in the knowledge of this subject, in that no one so far has ever isolated this organism from a case of rheumatic iritis in man and produced rheumatic fever in animals. In conclusion, the hope was expressed that this might some day be brought about, and the chain of evidence completed. The President said he did not regard rheumatic iritis as a common affection, but on the other hand the plastic exudation seen in gonorrhœal iritis was just as characteristic of micro-organisms. He himself had never attempted to extract the lymph found in the anterior chamber in that stage, and he would much like to hear whether the authors of the paper would expect to find micro-organisms in that exudation a short time after gonorrhœa.

Mr. Hartridge asked whether these rheumatic diplococci were likely to be found in cases of undoubted gonorrhœal origin. He had never seen acute rheumatism with iritis.

Mr. Holmes Spicer asked whether the ordinary bacterial methods of detection were sufficient.

In answer to the last question the authors stated that the micro-organism reacted to the stains in the ordinary way and they grew on ordinary media, and that when they were present there was no difficulty in recognising them. In reply to the President's question it was stated that if the gonorrhœa were caught in the early stage the organisms would be likely to be found, though not in large numbers, but in

the later stage they would not be found. Where there was a recurrent attack they would regard it as a case in which the organisms had become latent and encysted. The point brought forward in the paper was whether all the cases of iritis which followed some time after gonorrhœa were really gonorrhœal, or whether some of them were not rheumatic. Possibly as suggested by Mr. Hartridge both organisms might be found in the same case.

*Two Cases of Tubercular Choroiditis.*—Mr. W. H. H. Jessop. In the first case a girl aged 9 had a tubercular mass on the right sclerotic which had been removed and had completely healed up after the operation. A guinea pig which had been inoculated with material from this mass had died from tuberculosis. Ophthalmoscopic examination of the right eye had demonstrated two large detachments of the retina, evidently produced by some solid material. The vision was reduced to the perception of large moving objects only. These detachments, which at first obscured the disc, gradually sank to the periphery, the retina near the disc presenting the appearance of the soft changes seen in albuminuric retinitis. After eighteen months' open-air treatment the vision had improved to  $\frac{6}{18}$  partly, and the retinal changes were gradually clearing up.

In the second case, that of a female, aged 25 who had suffered from a mammary cyst, which had been found to contain tubercle bacilli, on examination of the eye a mass was observed in the choroid just above the disc, which later on completely disappeared, leaving the vision  $\frac{6}{6}$ . This patient had been under observation three and a half years.

The chief points emphasised were the absence of pigmentation, and of after effects, except some slight disturbance in the periphery in Case 1, the absence of vitreous opacities and of new vessels as seen by the ophthalmoscope, also the slight amount of secondary change in the fundus, taking into consideration the steepness of the detachment of the retina.

Mr. Sidney Stephenson said that Mr. Jessop had referred to the paper by Dr. George Carpenter and himself, in which it had been brought out for the first time that chronic surgical tuberculosis was, in a considerable proportion of cases, associated with choroidal tubercle. As far as he remembered in this paper nearly 10 per cent. of such cases showed choroidal

changes. They had therefore come to the conclusion that where the actual diagnosis of tubercle was uncertain it was very advisable to examine the eyes with the ophthalmoscope. He said he only remembered one case of definite tubercle of the choroid which was associated with vitreous opacities, and in that case there was reason to believe that the ciliary body was also affected. The absence of pigmentation was certainly a sign in the earlier cases of tubercle he had seen, but in other cases of very long standing pigmentation was rather a marked feature, especially in the form of rings or circles around the patch. From Mr. Jessop's description he would think that clinically there was very little doubt that his two cases were those of tubercle of the choroid.

Mr. Juler asked what treatment Mr. Jessop employed?—whether he injected anything subconjunctivally. He had recently had a case in which a boy who apparently had tubercle in the choroid had been cured by the local treatment.

Mr. Johnson Taylor asked whether the open-air treatment was good for such cases. He would like to hear how those late cases, in which there was decided pigmentation, could be distinguished from cases of congenital syphilitic choroiditis.

Mr. Holmes Spicer wished to know exactly what Mr. Stephenson meant by the term "surgical tuberculosis." He considered tubercle to be a very rare disease of the choroid.

Mr. Sidney Stephenson, in reply to Mr. Holmes Spicer, said surgical tuberculosis as he understood it was such common tuberculous affections as enlarged glands in the neck, chronic inflammation of the joints, &c. He had obtained his figures as regards the percentage, by first finding out the names of those patients in a Children's Hospital whose cases had been previously diagnosed as tuberculous glands, or joints, or lupus. Dilating their pupils by means of some mydriatic, he made a careful ophthalmoscopic examination of every one. He stated that it was theoretically very difficult to differentiate between specific and tuberculous choroiditis, but the concomitants and antecedents of the case must be taken into consideration. Those cases of obsolescent tuberculosis described by himself and Dr. George Carpenter showed, as a rule, in the fundus a single, fairly large lesion situated in the central part of the fundus, usually circular and containing one or more pigment rings, but very seldom accompanied with outlying change in the shape of peripheral choroiditis.

This offered a contrast to the ordinary cases of specific choroiditis, in which the changes were as a rule multiple and more marked in the periphery than in the centre of the fundus. And as a general rule in such cases a family or personal history of tubercle could be elicited.

Mr. Jessop, in reply, regretted he had not heard Mr. Stephenson's paper when it was read, but he had glanced through it afterwards, and had noticed that in one case which was said to be tubercle there was a perfectly white patch in the sclerotic bordered by deep pigment, a change which he thought was almost always due to congenital syphilis. With regard to the absence of pigmentation he mentioned one case in which in the fundus there were large masses 4 mm. high, apparently filled with caseous material which simply settled down and moved about from place to place in the fundus, leaving, however, no traces behind them. He said it was well known that miliary tuberculosis showed no pigmentation and no opacities. This question of pigmentation was the only one he wanted to clear up. He was in the habit of always sending tubercular cases to Margate, where they improved immensely. He had also seen cases abroad in which sub-conjunctival injection had been tried and which appeared to clear up and get well.

*Report of Five Cases of Glaucoma in which Adrenaline caused an Increase of Tension.*—Mr. A. F. MacCallan. Pointing out the advantages obtained by the use of the drug, such as decreased hæmorrhage on section of cornea and iris, and increased intensity of action of local anæsthetic, the writer laid stress on the fact that in certain cases of glaucoma the tension of the eyeball might be increased, to which disadvantage the following five cases relate. This point has an added interest in view of the fact that of late this drug has been highly recommended by Darier as a therapeutic agent of considerable power in the treatment of glaucoma.

CASE 1.—Acute glaucoma in both eyes. Eserine had been freely instilled and had reduced the tension in the right eye to normal, but in the left the T. was  $+1$  with much congestion of the conjunctiva, clear cornea, but shallow anterior chamber and semi-dilated pupil. Vision reduced to finger counting at 1 foot. In this eye in the fundus were several hæmorrhages, and for this reason immediate operation was

not considered advisable, but it was thought some good might result from the use of adrenaline together with eserine. After two applications of adrenaline the tension increased, accompanied by vomiting and severe headache, with steamy cornea. The adrenaline was at once stopped and not again applied, when the tension became lower, but increased again on one or two occasions subsequently, though never to the same extent of hardness as when the adrenaline was being used.

CASE 2.—R. eye, T. + 1, pupil semi-dilated, no cupping of the disc. L. eye, much conjunctival injection, slightly steamy cornea, pupil dilated. Vision, finger counting at 2 feet, T. + 2. While being prepared for an iridectomy on the left eye, adrenaline was several times instilled into this eye, together with eserine and cocaine, when the cornea became still more steamy and the tension increased to + 2.

CASE 3.—Acute glaucoma, R. eye, conjunctiva congested, pupil semi-dilated and oval, T. + 1, much contraction of the visual field, vision reduced to finger counting at 6 inches. L. eye, T. normal, pupil pin-point size. Adrenaline was instilled into the right eye, and in seven minutes from this there was increased tenderness of the globe, and the tension had risen to + 2, but the congestion of the conjunctiva was less, and the pupil had further dilated. Eserine was then used freely and the tension reduced. Four days later an iridectomy under the influence of adrenaline and cocaine was done, but at this time no increase of the existing tension could be detected.

CASE 4.—Attended as an out-patient with glaucoma of both eyes; the application of homatropine and cocaine caused an increase in the tension, which eserine again reduced. Later the tension increased in both, with injection of the conjunctiva; adrenaline was then used, which cleared up the conjunctival injection, but increased the tension to + 2, the cornea became steamy and the pupils dilated. Eserine was again employed, and reduced the tension to + 1, which remained unaltered for about a week. Later, paracentesis of the right eye was performed, which temporarily lowered the tension for a couple of hours, but in the end iridectomy was performed on the right eye, with excellent results.

CASE 5.—Right eye, acute glaucoma; L., some increased tension with cupped disc. Eserine decreased the tension of

the right, but it still remained about + 2. While the patient was on the operating table awaiting iridectomy on the right, adrenaline was instilled into this eye, which resulted in steaminess of the cornea, wide dilatation of the pupil, and an increase of tension to + 3. In this case, after the operation there was a good deal of reactionary hæmorrhage, probably due to the adrenaline.

Mr. N. Bishop Harman said that at the discussion on episcleritis at the meeting of the British Medical Association in Manchester in 1902, he had briefly reported a case which suggested that the use of adrenaline was not without danger, for in this case its use had been attended with diminution in the visual field and acuity of vision, which he thought might have been caused by either diminution in the nutrition of the retina by constriction of the intra-ocular vessels, or a transient attack of glaucoma caused by engorgement of the deeper vessels in consequence of the constriction of the superficial vessels caused by the drug.

Mr. Jessop said he had had trouble with adrenaline in cases of episcleritis and scleritis, but had partially overcome the trouble by doing massage on the eye after instilling the drug. His experience had been that the patients suffered severe pain twenty minutes after instilling the drug, which pain he believed to be due to the fact that constriction of the vessels was followed in twenty minutes by great engorgement of the vessels.

Mr. Parsons said that experimentally there was no question that the local effect of the drug was diminution of the intra-ocular tension; also that the second and general effect was an increase in the intraocular tension, but he did not think there was any possibility of a glaucomatous condition arising, unless there happened to be a predisposition to glaucoma. He stated that under the drug the sphincter of the iris would be acting against the blood vessels, and it was difficult to foretell what would happen. Experimentally, in normal eyes, and particularly in animals, the local effect was diminution of tension due to arterial constriction, and in consequence diminished secretion, and the general effect was increase of tension due to the effect on the general blood-vessels of the whole body, the splanchnic area being most affected, and other less important areas, the globe included, were areas of increased blood pressure. He pointed out that the solu-

tions of the drug were apt to vary enormously in strength of physiological action, perhaps due to unequal strengths of solution, or to its deterioration from being kept too long.

Mr. Holmes Spicer remarked, with reference to the greater effect of adrenaline on the arteries than on the veins in normal healthy vessels, that in old people, whose arteries were notoriously rigid, the drug would be more likely to act upon the veins than on the arteries.

Mr. Johnson Taylor asked whether the use of adrenalin in conjunction with cocaine before cataract extraction was likely to be attended with any risk of choroidal hæmorrhage. He considered a decided advantage obtained from its use was the absence of hæmorrhage from the conjunctival flap during the operation.

REGINALD F. BICKERTON.

### CLINICAL NOTES.

THE RECENT INCREASE OF TRACHOMA IN AMERICA. Medical Society of the County of New York.—Our kinsmen in the United States have become seriously alarmed, and apparently with good reason, at the increase in the distribution of trachoma which has been remarked of late. Lambert, in the course of a paper on "Trachoma in Schools," spoke of "the enormous increase in the number of cases of trachoma which have presented themselves for treatment in the various eye clinics in this city during the last few months," and showed, in the first place, how much good work had been done in the last few years in reducing the percentage of contagious eye disease in certain of the public institutions. But little had, however, been done in connection with the public schools until last year, when thirty-six were visited by inspectors. In these schools, out of 87,450 children more than 13 per cent. were found to have contagious inflammation of the eyes, and five-sixths of this was trachoma, either acute or chronic. Matters appeared so serious that a careful inspection of all the children was ordered by the Board of Health, with the

result that more than 20,000 children were excluded from school on account of contagious inflammation of the eyes, the great majority of such having trachoma. How great has been the increase in the closing months of 1902 is shown by the records of several of the eye hospitals of the city, and of these the Eye and Ear Infirmary forms a fair type. At this institution 1,241 cases of trachoma were treated in 1901, but no fewer than 2,323 between October 1, 1902, and the end of the year.—*New York Medical Record*, February 21, 1903.

COLOUR BLINDNESS IN YOUNG CHILDREN. — Roselli (Rome) has made very careful investigation into the colour-perception of a large number of children between the ages of 4 and 12, and has been led to the following conclusions: That, provided one deals with children who can to a certain extent explain their sensations, the smaller the child the more probable is colour-deficiency; that this colour-deficiency is more frequent the less the general level of intelligence in the child; that colour vision develops earlier in girls than in boys; that red and even violet are much less often unperceived or misinterpreted than green; and that since in every case of his in which daltonism was present and colour-education could be carried out, the improvement in colour-knowledge was very manifest, education in colours should be begun at an early age in all children, in order that "colour-blindness," with its risks and evils, may become a rarer condition. If this were done he considers that there would need to be much fewer rejections from the Navy, the railway service, &c., for defective colour-perception. Among the hundred children examined the extraordinary number of twenty-seven presented colour-blindness to a greater or less degree in all three "primary" colours, and fifty-two in one or two of the colours. It seems as if Signor Roselli had proved too much.—*Bollettino dell' Ospedale Oftalmico*, Rome, i., 1903.



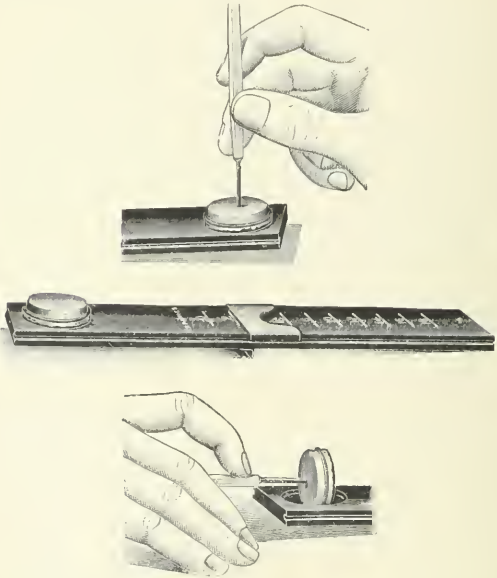
## A BALANCE FOR KNIFE TESTING.

BY PRIESTLEY SMITH, F.R.C.S. (Birmingham).

IN testing the point or edge of a knife in the ordinary way by means of the leather and drum, we judge empirically of the pressure which we have to employ in order to make a puncture or a cut. Thinking that it might be useful to determine this pressure by actual measurement, and so to establish some sort of numerical standard for a good knife, I made a few trials with an ordinary letter balance and was soon led to the construction of the simple instrument here figured. It resembles a see-saw in miniature. One arm of the beam carries a small drum covered in the usual way with the thin white kid leather sold for this special purpose; the other is marked with a scale indicating grammes, and carries a sliding weight. According to its position on the scale, the weight gives to the drum a resistance or upward pressure varying from 0 to 18 grammes.

To test the point of a knife, the drum is placed with the leather in a horizontal plane, the point is gently pressed against the leather and the weight is moved down the scale until the knife persistently punctures the leather instead of depressing the beam. The position of the weight shows the pressure required to effect the puncture. All punctures should be made in the transverse diameter of the drum as shown by a mark on the beam, so that they may all be at the

same distance from the fulcrum. A slight rotation of the drum will bring fresh portions of the leather into position as required.



To test the edge, the drum is placed on its side so that the leather is in a vertical plane, and the knife, passed through a slit in the leather, is pressed vertically downwards without thrusting or sawing movement. The cutting pressure is found by moving the weight as before.

Differences in the thickness of the leather will, of course, affect the results obtained. Only those parts of a skin which are free from brown opaque patches when held up to the light should be used. Further, the same leather will be punctured and cut rather more easily when very tightly stretched upon the drum than when put more loosely on it. By always stretching it enough to remove all wrinkles, but not much more than this, one can get sufficient equality in this respect. It must not be so slack as to fall into a fold beneath the edge of the knife, for such folding greatly increases its resistance.

The instrument does not claim to measure with minute precision, but it gives a much more accurate test than the unaided hand. Using a given piece of leather for all, we can compare half a dozen knives one with another, and place them correctly in order of merit. We can measure the effect on a given knife of immersion in boiling water, of antiseptic fluids, of use, and so forth. We can compare the merits of puncturing or cutting instruments of different shapes. If we believe in our own ability to put a perfect point or edge on a knife, we may with advantage compare our results with those of a first rate maker—and learn humility.

The following figures show the results which I have obtained with a number of new or newly-sharpened instruments supplied by a maker of the highest repute without knowledge of my intention to submit them to a special test :—

Seven Graefe knives all punctured at a pressure of 1 to 2 grammes ; with a very tight leather some of them punctured at even less than 1 gramme. They cut at pressures varying from 10 to 14 grammes, and with a tight leather some of them at 8 grammes.

As a rule they cut rather more easily near to the point than further along the blade.

Five bent iridectomy knives were slightly inferior in point to the Graefe knives; one punctured at 2 grammes, the others at 3 grammes. This was to be expected from the less acute angle of these knives. They cut at 10 to 12 grammes like the Graefe knives.

Five cataract needles punctured at 1 to 2 grammes like the Graefe knives. Their short cutting edges were inferior to those of the Graefe knives; one cut at 12 grammes, the others at 14 to 18 grammes. This bears out one's clinical experience that for division of capsular membranes a very small knife of the Graefe type is more effective than the cataract needle, unless the latter have unusually long cutting edges.

Three new cystotomes with small sickle-shaped cutting points, known, I think, as the Moorfields pattern, punctured at 4 to 8 grammes; two others, re-sharpened, only at 10 and 18 grammes. The difficulty of getting a very sharp point and a cutting edge on this important instrument is well known. Possibly some trials of the kind here described may lead to a modification of its shape.

Anyone who may care to make use of the knife tester here described may obtain it at small cost from Mr. R. Bailey, Optician, Bennett's Hill, Birmingham.

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## REVIEWS.

GONIN (Lausanne). Two Cases of Obstruction of Retinal Vessels, with Ophthalmoscopic and Anatomical Examination. *Archives d'Ophthalmologie*, April, 1903.

The first case occurred in a man, aged 64, who came complaining of a sudden loss of sight in his left eye, six weeks after an attack of epistaxis. The fundus showed abundant hæmorrhages in the course of the veins, the sight was reduced to counting fingers, but the field appeared normal. A clinical diagnosis was made of thrombosis of the central vein. A fortnight later the patient was seized with a paralytic stroke and died, and the eye was obtained for examination.

The vessels of the retina were found generally sclerosed, so that the distinction between arteries and veins was difficult to make. However, in the case of many of the vessels which showed ruptures with a hæmorrhage adjacent, the author convinced himself that they were veins. In none of them, however, was there any indication of thrombosis. In the arteries the cells of the intima were in general in a state of proliferation, so much so at their origin on the disc that the lumen of each of the three main arteries was nearly obliterated. So far there was nothing to contradict the diagnosis of thrombosis of the central vein in the nerve, and on examining sections through the optic nerve, one of the vessels was found to be dilated and completely blocked by a button of very dense tissue. This vessel, however, proved to be not the central vein but the central artery, and on careful examination the button in question was found to consist of endothelial tissue and elastic fibres growing by a pedicle from one place in the internal wall, and occupying the entire lumen with the exception of a mere slit. The possibility that the vein was obstructed further back than the sections extended, though not absolutely excluded, was rendered extremely improbable by the absence of any sign

of venous engorgement. Further, it was found on enquiry that retinal hæmorrhages had been noted on a previous occasion before the marked loss of vision, of which alone the patient had given any history. On these grounds the author seems quite justified in assuming that the clinical diagnosis was wrong, and that instead of a sudden venous obstruction, chronic arterial disease was at the root of the symptoms. The case therefore supports the theory of Reimar, who holds that endarteritis proliferans is responsible not only for most of the cases hitherto generally attributed to embolism of the central artery, but also for many of the cases diagnosed as thrombosis of the central vein, though why the ophthalmoscopic picture should be so totally different in the two classes of cases no one has yet attempted to explain. At any rate, the record of this case is valuable, especially as it constitutes one of the rare instances of a hæmorrhagic retinitis which has been subjected to pathological examination without being complicated by glaucoma.

The second of the cases discussed in this paper was one of true primary thrombosis of the central vein in connection with an attack of erysipelas, a cause which is capable of producing important changes in the blood or vessel-walls, without which it is doubtful whether primary thrombosis can occur.

The patient was a woman, aged 52, suffering from mitral insufficiency. She came to the hospital on account of facial paralysis, and the occurrence of facial erysipelas was consecutive to the application of wet cups to the temple. In the course of the disease the swelling of the left eyelids was so great as entirely to close them, and on recovering from this condition the patient found that the sight of her left eye was completely gone. A week later the patient was admitted to the eye hospital, and the left eye was found to be proptosed, with a dilated pupil, and with no perception of light. The ophthalmoscope showed a lazy disc with a few striate hæmorrhages at its margin, veins only slightly dilated, arteries narrow, and a large triangular hæmorrhage

with its apex at the upper and inner margin of the disc. There was a shallow detachment of the lower and inner part of the retina as far as the macula. The patient's general condition became worse, and three months after the commencement of her illness she died.

The occurrence of rapid amaurosis consecutive to a retrobulbar abscess, especially when complicated by erysipelas, is not uncommon, but the ophthalmoscopic appearances accompanying these cases are very various. Three different theories have been put forward to account for them:—

(1) Mechanical compression of the vessels in the optic nerve.

(2) The destruction of the optic nerve-fibres by a spreading inflammation.

(3) Infection of the vessels causing thrombosis.

In this case, the eye, enucleated within five hours of death, showed naked-eye changes corresponding with those previously noticed with the ophthalmoscope. The posterior half of the globe having been embedded in celloidin, a series of sections were cut and stained, so that the microscopic changes in each particular vessel could be traced. The following were the principal points noted.

The retinal arteries were occupied at their origin in the disc, and for some way onwards, by thrombi, but the fact that the endothelium was everywhere intact pointed to their thrombi being only a few days old—not, therefore, the cause of the blindness. In only one artery was there an appearance which might be considered due to endarteritis, and this was more probably due to the thrombus older than the rest.

The veins showed in different places thrombosis of different degrees of organisation, in some quite recent, as in the arteries, in others older, with proliferation of the endothelium.

The retinal hæmorrhages belonged to two different types: (1) venous hæmorrhages near the disc and adjacent to a thrombosed vein; (2) small arterial hæmorrhages near the macula. In several small vessels an interesting

observation was made. The endothelium was separated from the outer wall, the space between being occupied by corpuscles. This was observed in veins always above a thrombus, in arteries below; in each case peripherally to a thrombus. It represented, no doubt, the first stage of hæmorrhage extravasation.

The retinal tissue itself was much thinned in its internal layers, the external granules as well as the rods and cones remaining comparatively normal, an observation which contrasts strikingly with the state of things in retinitis pigmentosa.

The retinal detachment was due to an exudation which must have come from the choroid.

The optic nerve with its vessels was then examined. The bundles of nerve tissue were completely disorganised in the neighbourhood of the disc, less completely at some little distance back. There was no compensatory proliferation of connective tissue. The dural sheath appeared to have formed a complete barrier to the entrance of streptococci, as, though countless numbers of them were stained outside the sheath, none were discovered inside.

As to the vessels, at a point about 3 mm. behind the globe the vein was occupied by a thrombus in a state of advanced organisation. The artery, on the other hand, only contained comparatively recent thrombi. In spite of the obstruction there was no great engorgement of the vein above the thrombus, and the explanation of this was found in evidence of a capillary anastomosis having been established by way of the septa with the veins of the pial and dural sheaths. This makes intelligible the absence of any great venous engorgement following on the obstruction, as observed with the ophthalmoscope.

The explanation, then, which the author favours is that the primary cause of the amaurosis was a thrombosis of the central vein, caused either by pressure on the vein at its exit from the nerve, or more probably by a phlebitis proceeding from the orbit. The hypothesis of a mechanical pressure exerted on the vessels in the nerve itself is absolutely negatived by the dilated state of the vein at



the seat of thrombosis. It is probable that the development of a capillary anastomosis advanced *pari passu* with the phlebitis and thrombosis, but that it did not prevent some amount of stasis in the retinal veins. The arrest of the arterial circulation occurring subsequently helps to explain the comparative rarity of the retinal hæmorrhages.

Finally, the interesting observation was made, in comparing the ophthalmoscope appearances with the microscopic sections, that the parts of vessels occupied by recent thrombi appeared to the ophthalmoscope invisible; the corpuscles disappear so rapidly that the clot becomes indistinguishable from the retinal tissue surrounding it. The appearance of milky whiteness which is sometimes noticed in the course of a vessel is therefore one which has relation solely to the sheath of a vessel, not to its contents.

A. HUGH THOMPSON.

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#### G. CIRINCIONE (Sienna). Conjunctival Cysts.

*Beiträge zur Augenheilkunde*, 55 Heft, 1903.

Cysts of the conjunctiva have hitherto hardly received systematic investigation. The author classifies them as follows (excluding congenital cysts):—

- A. Superficial Cysts. (1) Cysts with clear contents (serous cysts): (a) of the fornices; (b) of the globe. (2) Cysts with opaque contents. (3) Cysts containing bacteria. (4) False cysts. B. Subconjunctival Cysts. (1) Cysts of Krause's glands. (2) Parasitic cysts. C. Lymphatic Cysts. D. Traumatic Cysts.

##### A. SUPERFICIAL CYSTS.

(1) *Superficial Serous Cysts of the Conjunctiva.* (a) *Of the Fornices.*—These are usually situated a few mm. from the edge of the tarsus, are always small, with thin, transparent walls, and clear yellow fluid contents. Microscopically they present a structureless basement membrane with no proper adventitia, but are buried in the submucous tissue,

lined by a double layer of epithelial cells, of which the outer, thin and flat, is always present and complete; while the inner, consisting of more cubical or even cylindrical cells, varies considerably, and is apt to be wanting, especially in the larger cysts; many of these latter cells are mucus-secreting or goblet cells. Besides the fluid contents there is some cell-detritus, often some rounded bodies with a distinct double contour, reminding one of "Russell's bodies," and certain hyaline concentric spherules with dark granules in their centres. The author traces the origin of these cysts to the small crypt-like glands which exist, though in scanty numbers, in all normal conjunctivæ in this situation: they consist of a single short tubulus lined with a double layer of epithelium, or may be bifid or trifid at the extremity. He thinks that foreign bodies, such as dust, silver nitrate, or parasites, getting into these crypts may cause the formation of the hyaline masses already referred to, and so modify the secretion of the crypt that its duct becomes obstructed and it swells into a cyst. When the distension has reached a moderate degree the secreting layer becomes imperfect, and the cyst therefore does not increase in size beyond a certain point.

(1) *(b) Serous Cysts of the Conjunctiva Bulbi.*—These are rare, the author having seen only four examples; the largest of these did not exceed 3 mm. in diameter. From the character of the lining epithelium, and from the fact that in one case a small downgrowth of epithelial cells was found in the immediate neighbourhood of the cyst, he thinks that such downgrowths, becoming separated from the surface epithelium, may form the starting point of the cysts.

(2) *Superficial Opaque Cysts.*—These are small, greyish in colour, situated near the convex border of the tarsus. If pricked, a worm of whitish material exudes. Microscopic sections make it probable that they are the result of a catarrhal process affecting Krause's glands, whereby the acini become distended with swollen and degenerate epithelium.

(3) *Cysts containing Bacteria*.—In only one form of cyst has the author been able to discover micro-organisms, namely, in a small round variety about the size of a pin's head, which is found in the tarsus near its posterior margin, generally singly. The contents of these cysts consist of cell detritus and hyaline material, in which, by Gram's method of staining, very small micrococci can be demonstrated.

(4) *False Cysts*.—The author distinguishes by this term certain small cysts which are formed, not by downgrowths from the surface or by pre-existing glands, but by the growing together of papillary outgrowths, or folds of the conjunctiva raised above its surface. They occur in some cases of chronic conjunctivitis, especially the papillary form, and in trachoma. Their lining epithelium seldom takes on a regular form, and in their contents is to be found a trace of their inflammatory origin in the presence of many wandering leucocytes.

#### B. SUBCONJUNCTIVAL CYSTS.

(1) *Cysts of Krause's Glands*.—These are found in the region of the fornices, especially at their outer and inner ends. They may reach the size of a bean, are usually of oval shape, and of translucent bluish aspect. They are movable under the conjunctiva at any rate when small; they are often associated with trachoma, or chronic catarrh, rarely with a quite normal condition of the membrane. On examination by serial sections, the typical form of these cysts is found to be a wide cavity immediately under the conjunctiva, tailing off in its deeper part into narrowing recesses which terminate in the more or less altered acini of the gland. The cause of the cystic dilatation is to be traced in most cases to inflammatory material round the duct, causing irregularity and stenosis of its lumen. But other modes of origin cannot be excluded, and in particular in those cases in which the cysts are present in quite young children, it is possible that their formation is developmental and due to non-canalisation of some part of this solid downgrowth of epithelium from which the

gland arises. The contents of the cyst always consist of a clear and colourless fluid in which by the microscope some *débris* of cells is to be found. Sections have a very characteristic aspect, that of a large cavity lined by a regular layer of epithelium representing the dilated duct, with small passages leading from it into the dilated and altered acini of the gland.

(2) *Parasitic Cysts.* (a) *Filaria*.—The author has had one case of a cyst due to this cause. The patient was a girl of 17, living at Ficarazzi: it is not stated whether she had ever lived elsewhere. The affected eye presented an ill-defined red swelling about the size of an almond on the sclerotic in the region of the equator of the globe. A diagnosis could not be made with certainty, but as the eye was being prepared for operation, Professor Cirincione and his assistants were astonished to observe a worm, evidently anticipating trouble to come, making its way out of the cyst: the excision was rapidly completed, and the worm proved to be an example of the rare *Filaria inermis*. The cyst closely resembled that of a cysticercus. The more commonly occurring *Filaria loa* does not appear to become encysted. It may be noted that Professor Cirincione, in speaking of the paucity of literature concerning this parasite, has entirely overlooked British observations, particularly Argyll Robertson's very complete and interesting case published in 1895.

(b) *Cysticercus*.—Cysts due to this cause are generally situated in the fornices, usually near the angles. They generally come under observation when they have reached the size of a pea, and will then, if there is little accompanying inflammation, present the appearance of a hard, elastic, slightly movable, oval nodule, with its long axis transverse: if near enough to the surface it will show translucency of a whitish or yellowish tint, but more commonly there is considerable inflammatory reaction and the characteristics of the nodules are obscured thereby. They occur chiefly in young children, rarely in adults. From cysts of Krause's glands (the only ones with which they could be confused) they may usually be distinguished by

their colour, by their closer adhesion to the sclerotic, and by the greater amount of inflammation of the conjunctiva over them. Their microscopical characters need not be enumerated.

#### C. LYMPHATIC CYSTS.

*Lymphatic Cysts* of the conjunctiva are well known: they are easily distinguished from other cysts by their branched and tortuous forms, their multiplicity, and their high degree of translucency. Of their cause we know nothing definite.

#### D. TRAUMATIC CYSTS.

*Traumatic Cysts*.—Professor Cirincione's views on traumatic cysts are easily summarised: there are no traumatic cysts of the conjunctiva. The descriptions of such, given by various observers, leave him unconvinced; most of them he would regard as "false cysts," due to foldings of the conjunctiva. The difference appears to be mainly a matter of terms.

W. G. L.

#### A. BRUCE (Edinburgh). Double Paralysis of Lateral Conjugate Deviation. *Review of Neurology and Psychiatry*, May, 1903.

The case recorded by Bruce was observed carefully by him almost from its onset until the *post-mortem* examination, at which the clinical diagnosis of the precise seat of the lesion was clearly confirmed. The patient was a fairly healthy girl aged 23, who at 15 had suffered from chlorosis, later from three attacks of influenza, and once from pleurisy; in other respects her health history was very satisfactory. The present illness she attributed to a slight accident sustained in January, 1902, when, falling off a ladder, she was stunned and rendered unconscious for about twenty minutes by striking her head upon the leg of a table. On the following day she felt slightly giddy when walking, and said she tended to fall over to the right side. The ophthalmic surgeon who saw her at that

time found no actual limitation of movement in any direction, but on strong movement to either side nystagmus came on; he considered, in presence of a crossed diplopia increasing to the right, that there was paresis of the left internal rectus. Three weeks after the accident she began to have severe headaches and had difficulty of moving the eyes, especially to the left side. At this time she first came under Bruce's care, when he found decided paresis of the left facial muscles; the tongue kept the middle line and the pupils were normal. There was slight inversion of the left eye, movement upwards and downwards was entirely satisfactory, but on looking to the left the left eye would not travel beyond the middle line, and the right could only just pass it. On an attempt to look to the right, the right eye failed to reach quite to the canthus, and as it approached its limit of movement nystagmus appeared, "while the left eye moves synchronously with the right one for a short distance, then becomes suddenly arrested in its course, and cannot by the strongest effort of volition be made to reach the inner canthus." When the test object was placed in the middle line or to the right of it, convergence was normal, but less perfect if the object was to the left side. Central vision and the fields of vision were quite physiological, as was also the fundus. The facts thus were (*a*) paresis of the left side of the face; (*b*) complete paralysis of conjugate movement to the left; (*c*) slight paresis of conjugate movement to the right; (*d*) partial paresis of the left internal rectus; (*e*) conservation of all other ocular movements, including convergence; (*f*) vertigo, formication of left side of the face, and ringing in the ears.

The peculiar behaviour of the left eye when the patient attempted to look to the right, which stopped halfway to the inner canthus and became the subject of nystagmic jerkings, Bruce attributed to a partial interference in the connection (by the right posterior longitudinal fasciculus), between the right sixth nucleus and that for the left internal rectus, since convergence was quite correctly accomplished. The diagnosis arrived at was that of a

lesion destroying the left sixth nucleus, infiltrating the left facial nerve in its course round this nucleus, and influencing some part of the left fifth nerve, and also passing across the raphe so as to implicate the right longitudinal fasciculus, and to a lesser extent the right sixth nucleus. Obviously the lesion must be small, since it had not in any way involved the pyramidal tract or any of the other motor cranial nerves. The facts that it was not limited to one sixth nucleus, and that the onset was not sudden, pointed to its not being hæmorrhagic in nature; the opinion was expressed that it was probably gliomatous or tubercular.

For a time the condition showed slight improvement under treatment, but in less than six months the patient died, the paralysis of conjugate movement evidently having become worse during a few days preceding death, the actual cause of which was a localised meningitis.

At the *post-mortem* examination this was found to exist, and after preparation the brain itself was examined. In the upper portion of the pons, at its posterior part, a small tumour was found projecting into and almost completely filling the upper part of the fourth ventricle. It occupied the position of the two sixth nuclei and the facial nerves as well as the posterior longitudinal fasciculi, but did not reach the fillet; it involved the left side of the pons rather more than the right.

The case throws some light upon a point which has been the subject of much discussion, the path, namely, by which the sixth nucleus controls the opposite internal rectus. It is agreed that the fibres ascend in the posterior longitudinal fasciculus, but it is not certain whether they enter the third nerve directly and pass thus to the internal rectus, or terminate in the nucleus itself. Further, if they do end in the nucleus, do they end in that of the same side or cross to the other, and if so, is their level of crossing at the sixth nucleus, or the third, or between the two? Van Gehuchten and Held among others have denied that these bundles contain any ascending fibres at all, but this seems to be an error, and the microscopic

appearances in this case assist in this conclusion. In it the degenerated fibres could be traced from the fasciculi into the nuclei, where they evidently ended without entering the third nerve at all. It is therefore clear from this, as well as from other similar cases, that the connection of the sixth nucleus with the opposite third is not direct but indirect. As regards the point of decussation Bruce's present case gives little indication of any at all; it is an admitted fact nowadays that certain of the fibres of the third nerve take their origin from the nucleus of the opposite side, and these may possibly be those destined for the internal rectus; and should this supposition be correct there would be no need for any crossing of the fibres whatever.

W. G. S.

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W. LÜTTGE (Brunswick). Tubercular Panophthalmitis in the Puerperium. *v. Graefe's Archiv für Ophthalmologie*, lv., 1.

A case of uveal tuberculosis with peculiar clinical symptoms of subacute puerperal panophthalmitis is described by the author *in extenso*. A quartipara, who seven years previously had been suffering from a probably tubercular affection of glands and periosteum, but was alleged always to have been otherwise well, had a rigor and short fever on the sixth day after a normal confinement. Two days later an inflammation of the right eye set in and led in not quite three weeks to complete amaurosis. Three weeks later perforation occurred and enucleation was performed. The examination of the eyeball showed both anatomically and bacteriologically tubercular panophthalmitis. After the operation dizziness and very violent headaches occurred; menstruation, which had been regular up to then, ceased *post partum*. Seventeen months after the commencement of the eye affection death occurred from cerebral meningitis. The clinical diagnosis had been puerperal panophthalmitis. Neither conjunctiva, cornea, nor iris showed any specific changes, but the



yellow reflex from the fundus seemed to point to a purulent panophthalmitis. It was, however, uncertain what kind of specific germ had led to this subacute inflammation. In 1897 Kroewig showed that five different species of bacteria may occur in the secretion from the uterus, viz., *Streptococcus pyogenes*, *Staphylococcus pyogenes aureus*, *Gonococcus* (Neisser), *Bacterium coli commune*, and anaerobic bacteria, while Bumm and Nisot found the true diphtheria bacillus. Of these, the first two have actually been found in puerperal panophthalmitis. It is probable that *Bacterium coli commune* is also capable of producing a puerperal panophthalmitis since it is known to circulate occasionally in the blood; moreover, the eye is not indifferent to its presence. Again, while the possibility of a metastasis from the gonococcus cannot be denied, it is yet doubtful whether that organism can produce panophthalmitis, considering that iritis and choroiditis of gonorrhœal rheumatism are generally not of a purulent nature, and that even in cases of severe gonorrhœal irido-choroiditis a complete restoration of sight has been observed.

Nor is the occurrence of a metastatic (puerperal) panophthalmitis probable from endogenous infection with the bacillus of diphtheria. In his own case, Lüttge found anatomically giant cells and fresh tubercle. The bacteriological examination gave a negative result, and it would probably have been impossible to identify the tubercular nature of the panophthalmitis without the invaluable help of experimental inoculation, which the author recommends even to the country practitioner as of the greatest importance. Unfortunately this is not always possible in this country, even to the specialist.

K. G.

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ERNEST CLARKE. *Refraction of the Eye.* London: Baillière, Tindall and Cox, 1903.

The true title of this book on its first page is *The Errors of Accommodation and Refraction of the Eye and their Treatment*, though the outside bears the legend "Refraction" only. It contains the substance of lectures

delivered on the subject by the author, and is intended to be essentially practical and to omit "all matter unnecessary for the busy practitioner and the over-burdened student." We regret that we cannot highly recommend the book; its good qualities are not by any means peculiar to itself, for they are the basis, and must be the basis, of all books on refraction, namely, a plain and exact statement of the facts of the case. But its faults are very considerable; primarily, that the whole arrangement of the sequence of chapters is most inconsequent. The first two are occupied with optics and the normal eye, respectively; next follows asthenopia, before there is any account of errors of refraction at all! But this is not all, for muscular asthenopia is found to be the substance of chapter xiii., and retinal asthenopia of chapter xv. Presbyopia, which, since it is a physiological condition, should precede errors, comes after hypermetropia, myopia, and astigmatism; aphakia is widely separated from hypermetropia;—no "arrangement" could be more inconvenient.

We do not see any particular gain in departing from the term hypermetropia to adopt that of hyperopia as Mr. Clarke does; if one is to be pedantic, myopia should first be given up, and perhaps astigmatism.

Besides these blemishes there are some serious errors in matters of fact; the description of the ophthalmometer, for example, is not correct, and the idea that the ciliary muscle is capable of correcting or of causing astigmatism in the normal eye had, we thought, been completely exploded. The most glaring error, however, which we have observed, is that of stating (page 152) that since a + 12 D. lens is usually required after extraction of cataract, if the patient "had a myopia of 12 D., he ought to require no glass at all for distant vision." Such a statement betrays a lack of acquaintance with the subject which we should not have expected to find in a book professing to deal with the errors of refraction and their treatment. The chapter on illustrative cases should prove very useful to a beginner.

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## OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

THURSDAY, JUNE 11, 1903.

Mr. W. LANG in the Chair.

## CASES AND CARD SPECIMENS.

*A Case of Central Serpiginous Choroiditis.*—Dr. L. Werner. The patient, a lad aged 15, complained of dimness of vision and distortion of objects looked at. He also frequently noticed a temporary scotoma. There was some uncertainty as to colours, and an ill-defined central scotoma. Ophthalmoscopically, the right fundus presented a circular patch with a pepper and salt look, composed of pale yellow spots mixed with pigment, the whole being surrounded by a bluish-green zone of haziness due to retinal oedema; this was the appearance on first examination, but later it changed somewhat. When examined again in three weeks' time the hazy zone had disappeared, but the choroidal changes had progressed considerably, some few patches of atrophy had appeared, which permitted a view of some of the larger choroidal vessels. Three weeks later a very large patch of choroiditis was observed, which, when seen three months afterwards, had extended into a large butterfly-shaped area of atrophy, mostly superficial, and joined to the original central patch by a narrow neck. Enclosed within these patches were one or two patches of healthy choroid. The patient attributed his dimness of vision to playing in strong sunlight. The exhibitor stated that he had called this condition serpiginous choroiditis for want of a better name to indicate the manner in which the disease had extended, chiefly creeping over the surface and enclosing portions of healthy choroid by the extension and final coalescence of processes. He called attention to a somewhat similar case described in the Transactions of the Society, vol. vii., plate 4.

*A Case of Conical Cornea.*—Mr. A. Stanford Morton. The patient, a female, showed in the centre of each cornea a very slight nebula, barely visible by daylight, and, on examination, her vision proved to be R. cum + 2 D. sph. and + 2.5 D. cyl. =  $\frac{6}{8}$ ; L. cum + 2 D. sph. =  $\frac{6}{8}$ , and J. 1 at 12 inches. With both eyes together with the proper correction,  $\frac{6}{8}$  perfectly. This patient, when first seen in 1880,

showed a high degree of conicity of both corneæ, with increasing failure of sight, which had extended over some ten years, the vision at that time being less than  $\frac{5}{60}$ , and only very slightly improved by minus glasses. In 1880 elliptical excision of the apex of the cone in the left eye had been performed, followed by the same operation on the right eye in 1881, which on this eye was repeated shortly afterwards.

*A Case of Masticatory Winking Movements.*—Mr. N. B. Harman. This patient, a female aged 38, showed a partial ptosis (congenital) of the left upper lid. On the jaws being worked, as in chewing, the drooping lid jerked up and down involuntarily; the movement was best demonstrated when the jaw moved to the right, the external pterygoid being then put into action, and simultaneously the lid jerked up. The vision, pupils, &c., were normal. The exhibitor explained these associated movements, not infrequently met with, by references to comparative anatomy, and stated that what at first sight appears to be a "freak" is really not so, but simply a revival of an old-time and long-accustomed association of movements. In fishes when the musculature of the spiracle and maxillary cartilage is examined into, a superficial and a deep set of muscles are found to come into play; the superficial for the movement (opening and closing) of the mouth of the spiracle, the deep for the movement of the maxillary cartilage—the descendant of this latter being in man the pterygoids. In respiration in the fish there is an association between the movements of the jaw and the gills; when the mouth is opened the spiracle dilates, and *vice versa*, so also when the mouth is opened to swallow food. This association of movements is partly suppressed in man by reason of the even balance between the levator and depressor of the upper lid; but in those cases, as in the one exhibited, where this even balance has been upset (shown by the ptosis), due either to weakness or ill-development of the levator, during the action of the pterygoid there is an associated relaxation of the orbicularis, of which the weak levator takes the fullest advantage, and consequently elevates the lid.

*Drawings of (a) Chorio-vaginal Veins (Posterior Venæ Vorticosæ) in the Myope and Hypermetrope; (b) some Congenital Abnormalities of the Optic Disc, and (c) Congenital Bilateral Pigmentation of the Cornea.*—Dr. W. E. Thomson

and Dr. A. J. Ballantyne. (a) *Chorio-vaginal veins*: In the right eye of a myope, five choroidal veins were depicted converging towards the disc, one of which coursed across the crescent, and disappeared alongside the nerve. In the left eye of a hypermetrope, five or six choroidal veins were shown converging towards the disc, most of which evidently ran backwards close to the nerve. In the right eye of a hypermetrope chorio-vaginal veins converged towards the disc and could be traced up to the edge of it; they could also be seen in the left eye coursing towards the disc, but did not appear to reach it. These fundi were poorly pigmented. Criticising the statements made by Oeller "that venæ vorticossæ chorio-vaginales are of rare occurrence," and by Haab "that as the vessels do not appear to occur in albinos or in any poorly pigmented eye unless it is myopic, we may assume that they have some connection with myopia," the exhibitors gave it as their opinion that though abnormalities seem to be particularly prone to occur in the myope, nevertheless posterior venæ vorticossæ or "chorio-vaginal veins" may be observed with moderate frequency in poorly pigmented fundi, whether myopic or not.

(b) *Congenital Abnormalities of the Optic Disc*.—(1) *Pigmented Colobomata of the Optic Discs*. This was a drawing of the left eye of a myope of 9 D. The drawing showed a disc partly replaced by a coloboma-like wedge of brown pigment in a network, and situated 1 D. below the surface level of the disc, the pigment being arranged like bone-corpuscles, and not extending quite up to the edge of the disc, but separated from it by a narrow band of nerve tissue. Some of the veins appeared to emerge through canals in the nerve. Surrounding the disc was an area of choroidal atrophy.

(2) *Congenital and Hereditary Development of Choroidal Tissue in the Optic Nerves of Two Brothers*. A drawing of the right eye, which corresponded in both patients, who were brothers, showed a mass of choroidal tissue in the temporal third of the nerve. The choroidal vessels could be traced distinctly on to the optic nerve. There was also much disturbance of the choroidal pigment on the temporal side of the nerves in all four eyes. Myopia of 10 D. was present.

(3) *Crater-like Hole in the Optic Disc*.—A drawing of the left eye of a myope of 6 D. The disc itself appeared as if

it were unduly extended on the temporal side, and in this particular portion was a vertically oval area about one-third the disc's diameter in length, presenting a gradation of shading from the circumference to the centre, this giving the impression of a crater-like opening, either extending into the nerve tissue, or itself representing a coloboma of the optic nerve.

(c) *Congenital Bilateral Pigmentation of the Cornea*.—A drawing of the right eye of a patient. In the middle of each cornea was a faint brown vertical line, which, on oblique illumination with a magnifier, was seen to be composed of minute chocolate coloured dots, the largest and densest mass being opposite the centre of the pupil; from this point downwards the dots were fewer and spread out like the tail of a comet. There had been no previous inflammation of the eyes of any kind. The condition was considered to be congenital for the following reasons: (1) Perfect symmetry, (2) the dots were all of the same size, (3) the dots were interstitial, (4) there were no indications of previous inflammation, (5) the eyes were myopic, and presented a congenital anomaly of the disc. Three other cases are recorded by Krukenberg in the *Klinische Monatsblätter für Augenheilkunde*, 1899, pp. 254 and 487.

*A Case of Pulsating Exophthalmos (traumatic)*.—Mr. G. Hartridge. The patient, a girl aged 10, showed a very prominent left eye, which was markedly convergent from complete paralysis of the sixth nerve. The vision with this eye was  $\frac{9}{6}$ , and on examination of the fundus the disc was found to be hyperæmic, and the retinal veins full and tortuous. A loud bruit could be heard over the left side of the head, whistling in character; this bruit when first heard was "blowing" in character, but it had changed of late. The mother of the girl stated that in July of last year, while playing in the hayfield with other children, the patient had been struck in the left eye with a hay fork, one of the prongs of which entered below and to the inner side of the inner canthus. Soon after this accident the left globe was noticed to be more prominent than the right, and to turn inwards.

*Tumour of Ocular Conjunctiva. Papilloma or Epithelioma*.—Mr. A. Ogilvy. The patient, a man, sought advice in the first instance for what appeared to be a pterygium, which

had become inflamed and was encroaching upon the cornea. This had been dissected off and turned back, and from the cicatrix, which occupied the place of the removed pterygium, a small granulation had grown, which had been removed two or three times, but repeatedly reappeared, until at the present time there is a tumour 15 mm. by 12 mm. and 3 mm. in thickness, encroaching on the cornea for 2 mm., sessile and showing very few vessels. There was but little pain, and no enlargement or infiltration of glands. The patient's right hand and arm were covered with warts, so it was thought that it had infected the conjunctiva from one of them, hence the tentative diagnosis of papilloma. A microscopical section of the growth showed epithelial cells, but no cell-nests. The consensus of opinion was that the tumour was an epithelioma, and that the eye ought to be removed.

*Obliteration of a Retinal Vessel, with Formation of New Retinal Vessels.*—Mr. Rayner D. Batten. The patient, a woman aged 68, showed on examination of the right eye considerable changes in the walls of the retinal vessels. The temporal branch of the upper retinal vein appeared to be obliterated and converted into a white streak for the greater part of its course, but towards the periphery it appeared to be patent as a thin red streak with white borders. Above and below the obliterated part of the vein numerous changes in the retinal vessels with extensive formation of new vessels could be made out; many of the smaller vessels appeared to anastomose, several small hæmorrhages were present, and one vessel appeared to break up into numerous small vessels and to unite again and continue its course as a single vessel. In the left eye marked beading of the veins and their constriction where crossed by the arteries, together with a large circular patch of superficial choroidal atrophy in the macular region, were the only marked features. The urine contained neither sugar nor albumen.

*Papilloma of the Ocular Conjunctiva.*—Mr. Sydney Stephenson. The patient, a plasterer by trade, aged 45, complained of his left eye, which on many occasions had been irritated by pieces of mortar, sand, and lime getting into it during his work; but after one such occurrence he had noticed "a small red speck" on his left eye some six weeks after the irritation. At the present time, extending from the inner canthus to the lower inner edge of the cornea a small mass of

red material is visible. On eversion of the lower lid several grouped papillomata are seen, those lying within the lid flattened by pressure against the globe, but those lying in the palpebral fissure much more prominent, one of them being distinctly pedunculated.

*Congenital Defect of Movement of one Eye associated with a slight degree of Enophthalmos.*—Mr. Herbert L. Eason. The patient, a child aged 5, showed a slight degree of enophthalmos of the right eye. When the patient looked straight forwards this diverged, and there was ptosis on the same side; when the patient looked upwards the right did not follow the left as it turned up, but turned inwards and became distinctly more retracted, the lid remaining stationary. On looking downwards the right eye rotated somewhat, at the same time turning downwards and outwards and becoming less retracted; and it appeared unable to be moved towards the left, but on looking to the right the right eye moved outwards to the same extent as the left, while the ptosis became more marked. The pupil reactions were normal, and the vision with correcting glasses was R.  $\frac{6}{12}$ , L.  $\frac{6}{15}$ . This condition had existed from birth; there was no history of injury either during the birth or later.

The exhibitor considered the lesion to be a nuclear one, somewhat in the nature of a non-development of the cells in that part.

Mr. N. Bishop Harman said he had seen one or more of the ocular muscles in fishes cut through, and they had later become attached to the eyeball through the optic nerve; he thought possibly that condition might be present in this patient, but he was certain the third nerve was present.

Mr. Eason, in reply, believed there was no reason to suppose that the lesion was not in the nuclei at the base of the floor of the third ventricle, since this was the usual site of lesions involving the third, in which the external ocular muscles were paralysed without there being paralysis of accommodation or pupil reactions. The cells for innervation might be congenitally defective.

#### PAPERS.

*Fistula Formation in the Treatment of Glaucoma.*—Major H. Herbert, I.M.S. The paper was written for the purpose of reviewing results rather than with any intention of claiming originality in ideas or in practice. The writer pointed



out that in India the great bulk of cases of primary glaucoma met with were of the distinctly chronic type, and very many of the patients only submitted themselves to operation when very little sight remained, in consequence of which a typical iridectomy failed to relieve tension in a large proportion of the eyes so treated. By observation of the results of other operators, as well as of those in his own hands, the writer soon became convinced that much more general success attended those cases in which by chance the iris prolapsed and healed in the wound; with this was also coupled the observation that a large prolapse uncovered by conjunctiva was frequently associated with iritis from the beginning, whereas a similar prolapse entirely covered by conjunctiva had not this liability. The results of the operation in which an attempt had been made to produce a prolapse of the iris, which should be completely covered by conjunctiva, with a view towards determining to what extent the immediate protective influence of a conjunctival covering might remain permanently, were given in a subjoined paper, in which he dealt with 130 operations for primary glaucoma. Forty-eight of these were seen again after operation at periods varying from six months upwards. The writer stated that so far as he knew none of the eyes so operated upon had as yet been lost through late infective inflammation. In two of the cases, however, inflammation set in immediately after the operation, probably owing to infection during the operation, and one of these two led to gradual total loss of the eye itself and to sympathetic inflammation of the other.

The relief of tension provided by a fistulous cicatrix appeared to be certain and permanent. In no single case out of the number had there been any question of a return of plus tension after free filtration had once become established. With regard to this the writer pointed out that the prolapsed loop of iris is not at once pervious, and in a few eyes the immediate lowering of tension—provided by the leaking of the wound—was followed by a period of slightly raised tension, lasting even to two or three months. The formation of the cystoid cicatrix simply by the inclusion of the prolapsed and folded iris was not found to be sufficient, an iridectomy being always required as an adjunct, especially when the iris had undergone considerable atrophic change, as when it had become fibrous, tough and inelastic. It had

been found that in many eyes the tension finally was about — 1, and those eyes most damaged by the previously high tension were softer than those not damaged to the same extent. The effect of fistula formation upon the vision was proved to have been more favourable than could be expected from simple iridectomy, and no case of glaucoma appeared to be too advanced if fingers could be counted at any distance, however contracted the field of projection might have been. In seven cases there had been more or less evidence of further atrophy of the optic nerve or retina, in spite of the relieved tension. The superiority of the visual results of fistula formation over those of typical iridectomy in cases of advanced glaucoma (chronic) was sufficiently marked to emphasise the probability already suggested (*vide* the late President's address on Glaucoma), that failures really attributable to imperfectly relieved tension are often put down to atrophy, progressing in spite of relieved tension. Besides these two immediate infections a complication which at times caused anxiety was the delayed re-filling of the anterior chamber. In one case the lens became rapidly cataractous after the operation and was extracted a month later, while the anterior chamber was still quite empty. Out of the whole 130 operations this latter complication, and apparently direct infection in two cases, were the only instances which proved directly disastrous. The only other early complications were a small escape of vitreous, and a large hæmorrhage in the fundus, which eventually became absorbed.

The conclusions arrived at by the writer were that though an eye cured by typical iridectomy was a much sounder organ than one with a filtering cicatrix, still something further was wanted in cases in which an iridectomy had already failed, or in which it seemed likely to fail, and where patients could not be expected to return promptly for further treatment after possible failure of the first operation. In cases of late infection, free administration of mercury had been found frequently effective in allaying the inflammation. The connection of the iris with the fistulous track, it was found, could be severed at a later date. The writer considered the weakest point in this method of treatment to be the possibility of exciting sympathetic loss of the other eye, but he considered the chance to be very remote, taking into consideration the rarity of the occurrence of late inflammation in the

operated eye. The aim in most of the operations performed was to make the prolapse as small as possible. Another method attempted was by conjunctival infolding, and in this it was found that the conjunctival flap did not long remain infolded, but nevertheless a filtration scar was produced, thus showing that even a temporary separation of the lips of the sclero-corneal incision was effective in forming a permanent fistulous track. Another method was the use of a silk suture to keep the conjunctival flap infolded, actually fixing the apex of the conjunctival flap to the posterior surface of the cornea just within the anterior chamber, the suture being removed after twenty-four hours; a small iridectomy was done as well to prevent prolapse of the iris, or rather to forestall it. In two cases by this method the apex of the flap actually became adherent to the lens capsule. Other methods resorted to were temporary iris prolapse, leaving the iris to prolapse after the operation, and after a few days (up to six in some cases) after the formation of the prolapse the wound was reopened, and the prolapsed iris excised, but this method did not prove altogether successful. Another method was the introduction of small pieces of bent capillary glass tubing through scleral punctures, but this did not prove successful either, since the thickening round the tube was sufficient to prevent any filtration.

Mr. Priestley Smith stated that for many years he had thought the cure of chronic glaucoma was only to be obtained for certain by some method which enabled one always to obtain a sub-conjunctival sclero-corneal fistula. He considered there were three ways in which one might hope to attain this: firstly, by the inclusion of some conjunctival tissue which would prevent the lip of the corneal, or sclero-corneal, wound from uniting; secondly, by the inclusion of some iris tissue; and, thirdly, by obtaining an ununited scleral wound with a bleb over it, but without the inclusion of any foreign material. He considered the failure in some of Major Herbert's cases in obtaining an infolding of the conjunctival flap to be due to the aqueous pushing out the conjunctival flap before it had had an opportunity of forming a fair adhesion; but if this infolding could be maintained for twenty-four hours he considered it would form a sufficient attachment permanently to prevent the union of the lips of the wound. To bring about this result, he considered the addition of a scleral puncture would be of great service. By

means of sub-conjunctival scleral puncture (which he had done for many years in every operation for primary glaucoma), he considered one rendered the eye safe from any return of tension for at least forty-eight hours, and therefore against those malignant symptoms which used to be so dreaded when the lens was jammed against the cornea.

Mr. Treacher Collins said that some years ago, when engaged in the pathological examination of several eyes which had been operated upon for glaucoma—some successful and some not—he had convinced himself that iridectomy relieved the tension in one of two ways: either it opened up the normal channels for the passage of fluid by dislodging a faultily placed iris, or else a sclero-corneal fistula was formed by prolapse of the iris, and through that fistula fluid was able to have access to the sub-conjunctival tissue. He had so far never attempted to produce a cystoid scar where there was any danger to the second eye from the adhesion of the iris to the conjunctiva running the risk of infective inflammation involving the iris, causing intra-ocular inflammation, and so placing the other eye in danger. He pointed out that there were many cases on record in which a cystoid cicatrix, which had become involved in a general conjunctival inflammation, led to the iris becoming also inflamed, and resulting in suppurative panophthalmitis. He had given up making cystoid scars in consequence of a case which had come under his notice, in which he had suggested that the way to make a cystoid cicatrix was to allow a prolapse of the iris to occur. The suggestion had been taken seriously, and had been carried into effect on a patient, whom he was shown some little time after when he had developed sympathetic ophthalmitis. He considered the operation for producing a cystoid scar should be limited to those cases in which there was no second eye, or only a useless one.

Sir Anderson Critchett said that some years before he had ventured to prophesy that permanent fame awaited the man who could invent a safe cystoid cicatrix, and he believed they were still waiting for that invention. He mentioned one case which had particularly impressed itself upon his memory—it was that of a nurse at St. Mary's Hospital who had sub-acute glaucoma; he had operated first upon one eye, and then later on upon the other. In the first eye there was no anterior chamber, and he had had to operate with a Graefe's needle knife, but succeeded in doing the iridec-

tomy—not, he stated, the very neatest he had ever done—and it was followed by a cystoid cicatrix. The operation on the other eye was from a cosmetic point of view a much better result; but the patient had repeated threatenings of attacks of glaucoma in the eye, and on one occasion did have an attack, but in the eye with the cystoid cicatrix she never had a relapse. He said he agreed with Mr. Treacher Collins in thinking that deliberately to endeavour to procure a cystoid cicatrix must be rather a dangerous proceeding. His (Sir Anderson's) father's operation of iridodesis had been practically given up for that very reason, since it was necessary to have an adhesion of the iris in the wound. He however was quite prepared to try the operation described by Major Herbert if he saw a favourable opportunity, but he thought it was one which should be undertaken with every possible care, and he agreed with Mr. Collins that it was one which should only be tried in cases in which the other eye, if present, was useless.

Major Herbert, in his reply, said he thought it quite possible that the operation of infolding the tip of the conjunctival flap would be greatly facilitated by the scleral puncture suggested by Mr. Priestley Smith. With regard to the remarks about infection, he pointed out that the important point was that the ill repute of the cystoid cicatrix had been mainly due to those forms of prolapse which were uncovered by conjunctiva. His experience showed that the risks in the operated eye were extremely small, and still less must the risk to the other eye be in cases in which the wound was well covered by the conjunctiva.

*The Innervation of the Musculus Orbicularis Palpebrarum.*—Mr. N. B. Harman. This paper was for the purpose of setting forth the evidence which had been brought forward in support of the theory that the musculus orbicularis palpebrarum was innervated by the nucleus oculo-motorius, and also to bring forward a mass of evidence which, in the opinion of the writer, made such an innervation in the highest degree improbable. Mendel's hypothesis, which he attacked, stands thus: "The frontalis and orbicularis palpebrarum muscle, although peripherally supplied by the facial nerve, are 'eye muscles,' and form part of the oculo-facial group, whose central innervation is the oculo-motor nucleus." He gave a demonstration of the eyelid muscles of the shark, in which it was shown that the muscles were arranged, as in man, in

two layers very closely blended—a superficial and a deep set—and that the musculature of the eyelids was derived from the musculature primarily belonging to the spiracle or first gill slit, the homologue of man's external auditory meatus; he showed also that the superficial muscles "migrate" to some extent to become eyelid muscles, while the deep set become the pterygoids. The writer then pointed out that though the muscles had "migrated," they were still supplied by the original nerve nuclei, so that anomalies such as "jaw-winking" movements were occasionally observed. In conclusion, it was stated that there was no doubt that this orbito-spiracular musculature was from its earliest, most primitive form innervated by the facial-complex, by nuclei which were originally ventral in position in the medulla, and that this orbito-spiracular musculature was the primitive ancestor of the complicated facial musculature of man, and macroscopically it was still supplied by part of the original facial-complex nerve.

The President said that since Mr. Gunn had brought forward the first case of jaw-winking movements, and allied movements hitherto unexplained, this paper was the first to give a really satisfactory explanation of the anomaly.

Dr. Aldren Turner said it was supposed from not only Mendel's experiments, but from pathological observations on certainly one case, and from clinical observations of several, that the orbicularis palpebrarum, and perhaps also the frontalis muscle, were very closely associated with the external ocular muscles in their innervation, rather than with the facial muscles. He considered it a little difficult to assume that the innervation could change from splanchnic to somatic, but he also thought that one must have some latitude in these matters when dealing with an animal so high up in the scale as man. He pointed out that Mr. Harman's observations were based almost exclusively upon fish. It seemed to him that the orbicularis palpebrarum in its physiological action was an eye muscle; it was there for the definite purpose of protecting the eye. The reflex of the orbicularis palpebrarum was obtained from the cornea and the conjunctiva, and that action, therefore, seemed to him to be more in harmony with ocular movements than with facial movements, and therefore it was partly an ocular muscle and less distinctly a muscle of expression.

REGINALD E. BICKERTON.

KNEE-JERK PHENOMENON IN INTERSTITIAL  
KERATITIS (CONGENITAL SYPHILIS).  
WITH A SCHEME FOR STANDARDISING  
THE VARIATIONS IN THE PHENOMENON.<sup>1</sup>

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F.R.C.S.ENG.

EXAMINER IN ANATOMY AT THE UNIVERSITY OF CAMBRIDGE;  
OPHTHALMIC SURGEON TO THE BELGRAVE HOSPITAL FOR  
CHILDREN.

AN account of the systematic examination of the knee-jerk phenomenon in patients suffering from interstitial keratitis the result of inherited syphilis was published some time ago by Lang and Wood.<sup>2</sup> These workers came to such conclusions that the establishment or correction of them is of some importance. For the presence or absence of the knee-jerk phenomenon is a matter of no small count, since we have come to regard it in the light of an index into the state of certain portions of the nervous system; and consequently the absence of this phenomenon in a large percentage of patients suffering from definitely ascertained results of inherited syphilis, will imply that these unfortunate folk also suffer a

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<sup>1</sup> Read at the Swansea Meeting of the British Medical Association, 1903.

<sup>2</sup> *Ophthalmic Hospital Reports*, vol. xii., 1888, p. 312. The present investigation was made owing to some remarks made recently during the discussion of a case shown before the Ophthalmological Society.

particular deficiency in the condition of the conducting paths of their nervous impulses; or else the absence of the phenomenon being proved, without the existence at some time or other in their history of any special liability to this order of nervous derangement, will throw some discredit upon the diagnostic value of this hitherto important sign.

The results of the previous investigation of the phenomenon were summarised by Lang and Wood thus :—

“(1) That in about 30 per cent. of all cases of interstitial keratitis the knee-jerk is decidedly subnormal.

“(2) That in about 10 per cent. of all cases it is entirely absent—all known causes of subnormal tendon reflexes, outside of the constant fact that the local eye disease exists, having been eliminated.

“(3) (Unconnected with the present question.)

“(4) That it is rare to find a case of exaggerated patella tendon reflex in interstitial keratitis when unaccompanied by some of the affections known to produce the former.”

In all they examined sixty-two cases.

At the outset of my investigation I perceived that to make my results of any value, some uniform, simple, and easily repeated mode of examination must be followed. Further, such mode should be one which would reduce the personal factor, and its variation with time and place, to a minimum. There would follow in direct proportion to the attainment of such an ideal in method, the possibility of others making similar examination and of their arrival at sensibly similar results.

The ordinary method of crossing the knees does not appear to be satisfactory for comparative examination. No two patients cross their knees in the



same manner. The fact that they are required to cross the knees directs their attention to their lower limbs and voluntary contracture of the muscles results. There is the confusing element of the swing of the supported limb produced by the force of the stimulus. In women the crossed knee position produces much dragging on the supported limb by the clothes.

The method I have adopted is as follows. The patient is seated comfortably in a chair of such height as will allow the thighs to rest on the seat and the feet to be evenly planted on the ground directly below the knees. The patient is then directed to look at and point with both forefingers towards some mark upon the ceiling. The hand of the examiner then grasps the quadriceps extensor cruris of the limb to be examined in its fleshy part, and after feeling the exact position of the yielding patella tendon, a tap is administered to the tendon with a thin hard-edged book or piece of mill-board.

It is obvious there must be a reasonable uniformity in the "tap" administered to the tendons. The best form seems to be produced by an easy swing of the hand from the wrist. The degree of tap I arrived at by using such force as when the blow was administered to the back of my own, or another's clenched hand, was just short of producing sharp pain. As a weapon I mostly used a piece of mill-board, the cover of a test-type. It weighed five ounces, measured  $8 \times 6 \times \frac{1}{4}$  in., and when the tap was brought down on to the pan of a spring-balance the scale registered one and a half pounds.

The method adopted has the following advantages: The direction to the patient to look at and point to an object above him completely distracts his attention

from the business in hand.<sup>1</sup> The position of the limbs described is, I think, preferable to the crossed knee position, since it is more easily assumed, especially by women. On grasping the crureus the examiner can at once detect any undesired voluntary contraction of the muscle. By this method the condition of the phenomenon is judged mainly by *feel*, and the perception of the movement of a muscle is finer than the sight of it. Lastly, there is no risk of mistaking for a proper jerk the swing sometimes given to a supported limb by the impulse of the blow. The patients, even children, readily follow directions, and on the second and subsequent examinations put themselves into position of their own accord. For all these reasons the method is both actually and relatively the more expeditious manner of making the examination.

Lest it should be considered that the fixity of attention required of the patient by the foregoing method should amount to "reinforcement," I compared in several cases the results obtained by it and those obtained in the cross-knee position. There did not appear any indication of reinforcement.

The variations in the degree of reaction have been classified as follows: Absent, reinforced, normal, sub-normal, brisk, exaggerated, violent.

The "normal" reaction must be learned by experience. It is not difficult to appreciate as normal a certain sensation of uprising in the crureus as it contracts; in some cases the foot will slide forward along the ground as a result of the contraction. When this foot movement exceeds about three inches the pheno-

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<sup>1</sup> In examining blind children, the hands were held above the head and the face tilted upwards by a nurse.

menon has been classed as "brisk." When the reaction in the crureus is communicated to the body, and the patient has a miniature clonic spasm—under these conditions the patients frequently complain that "it hurts them"—it has been marked as "exaggerated." Reaction that could be described as "violent" there were none in this investigation. The term is noted as the extreme form to cover the condition of the phenomenon in such cases as spinal paralysis from vertebral fracture.

Of the diminished reactions, the term "subnormal" has been applied when the jerk is just perceived to be present and no more. "Reinforced," when to the ordinary method the reaction was not present, yet could be elicited by directing the patient to undertake forceful muscular action of the upper extremities, as in pulling hand against hand.

"Absent" needs no comment, save to note that the reaction was not declared absent until the examination had been repeated upon the bared limbs of the patient, with varying degree of tap, and every effort of reinforcement.

In a large number of cases (41) the condition of the reaction has been examined on several occasions at intervals extending over eight months; this was done without reference to the finding on previous examination. No noticeable variation in the condition has been found, as will be seen by reference to the summary of cases.

Of the cases examined, 39 were gathered at the Middlesex Hospital, 40 at Moorfields Eye Hospital, and the remainder from amongst the children of the Blind Centres of the School Board for London.

As far as possible the date of onset of the attack or attacks of interstitial keratitis or other manifes-

tation of the diathesis was ascertained, and whether specific treatment had been or was being administered. In the case of the children at schools, in the absence of the parents no reliable history of attack or treatment could be obtained.

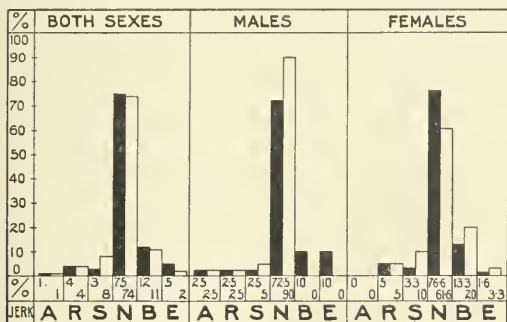
In all 100 consecutive cases (40 males and 60 females) were examined; of these 19 were in the state of an initial acute attack of the manifestation, 16 were suffering acute or subacute relapse after the earlier attack had become quiescent, and in 65 the manifestation was in a state of quiescence.

As a standard of comparison I have examined an equal number of healthy individuals, choosing the same number of each age and sex found amongst the diseased. In the succeeding table the results of these examinations are shown graphically. The solid black columns indicate diseased subjects, the outline columns healthy subjects; the actual percentage represented by each column is given at the base of the column.

The table of results shows that there is no noticeable difference between the condition of the phenomenon in the subjects of constitutional syphilis and in healthy folk, indeed the figures are surprisingly alike. In 75 cases of disease the reflex was "normal," in health in 74, whilst there were a fair number of both brisk and exaggerated reactions. The similarity of the results is rather broken if the reactions of males and females be taken separately. In disease the relative proportions of the condition of the phenomenon remain nearly the same as for the totals of both sexes, but in the reactions of health there is a considerable difference. The reactions in healthy males are very steady, as many as 90 per cent. being "normal," whilst the females show much variability, only 61.6 per cent. are "normal," 10 per cent. are

subnormal, and 20 per cent. are brisk. I am not aware that this variability of the phenomenon in healthy females as compared with males has been noted before.

A comparison of the condition of the phenomenon in the varying states of the diathesis, in acute attacks, relapses, or in quiescence of the manifestations,<sup>1</sup> or when under specific treatment or otherwise, does not show any noticeable differences.

TABLE OF RESULTS.<sup>1</sup>

Considerations *à priori* might lead one to suppose that there would be found a not inconsiderable number of cases in which the knee-jerk is absent, as had been found in the investigation of Lang and Wood; for it is a matter of common knowledge how grave are the

<sup>1</sup> In cases where the phenomenon was examined more than once with different results, that result found most frequently is given; and with two differing results, that nearest the "normal" is returned, *e.g.*, Case 2, normal twice, brisk twice, returned "normal"; Case 5, brisk once, normal once, returned "normal."

defects exhibited in persons suffering this inheritance. The general nutritional defects which produce the frequently repulsive physiognomy, the defects which are exhibited in the distortion of non-vascular structures such as teeth and cornea, the prolonged sub-acute disorders of peripheral nerves, resulting in greater or less degrees of deafness and the like, and the deterioration of higher portions of the central nervous system, with serious mental disability, even to idiocy, are too frequent not to lead us to some expectation that disorders of the great conducting paths of nervous impulses would follow in some particular degree, and that this would be marked, as it undoubtedly is, in many cases of the acquirement of the disease in maturity. It appears to me, however, that the effects of the congenital and acquired taints are widely separated in regard to their effects on the great conducting paths, and that the following line of argument puts the case fairly.

In almost all conditions affecting the matured organism as a whole, it has been noted that some tissues show early and seriously the disintegrating effects of the disorder, whilst others for a long time resist this action, or are even excited to an unnatural activity. Such a condition of affairs is well seen in starvation. With loss of food the grosser tissues and organs waste and shrink, the lesser functions of the organism are diminished or lost, whilst the higher conscious faculties are at some periods exalted to a degree, which under favouring circumstances, has resulted in the production of mystics and fanatics whose influence in the affairs of men has been incalculable. To such ascetics the ordinary affairs of life—cleansing, clothing and locomotion—have become irksome or impossible, whilst their cerebration has verged on madness. The strain

on the conducting paths of their nervous system, suffering in their degree with the lesser tissues from starvation, must be in a parlous state under the excessive stimulation of the excited higher centres. It is no wonder hardships, exposure, excessive wear and tear have been considered causes of *tabes dorsalis*.

If this be so under comparatively simple conditions, how much more when the organism is subjected to the prolonged and insidious influence of the poison of syphilis? That there is a general disturbance in metabolic processes cannot be doubted in view of the illimitable variety of the manifestations of the disease.

It does not seem unreasonable to adopt an argument from analogy and suggest that the action of the prolonged and insidious poison of syphilis will produce results similar in their degree to that of general starvation. The active and mature higher centres will be the last to fall under the depressing influence of the poison, and until such time arrive their "habit" of work is not altered; perhaps they are even stimulated to an excessive activity in a conscious desire to keep things straight under difficulties; and consequently there will fall on the conducting paths a strain equal to or greater than normal, at a time when their conditions and reparative processes are probably, on account of the influence of the poison, less than normal.

In the organism the subject of congenital syphilis the conditions are not the same. It is developed from the impregnation of the ovum to the expulsion of the product of conception under the influence of the poison. The higher centres, equally with the conducting paths and grosser tissues, are born under its influence and shaped in its processes, and it is improbable that the conducting paths will ever be subjected to the strain and duress of active and virile

impulse-generating centres; rather, it would seem, they will be the less liable to undue strain in proportion to the degree of inefficiency of the higher centres.

It is perhaps on account of some such considerations as these that degenerations of the higher centres, even to imbecility, are the more common ultimate resultants of the nerve changes of inherited syphilis, whilst degeneration of the conducting paths—*tabes dorsalis*—is the more common ultimate resultant of the nerve changes following acquired syphilis.

These arguments appear fairly warranted by the known facts of the conditions; they account for the finding that the knee-jerk phenomenon, as a sign of the condition of the conducting paths, does not exhibit any noticeable variation from the normal balance of the phenomenon.

An interesting complement to this enquiry would be the results of an investigation into the conditions of the knee-jerk phenomenon in cases of the acquired taint at different times and periods of the disease.

[NOTE.—A summary of the 100 cases of congenital syphilis will appear in the *Archives of the Middlesex Hospital* at a later date.]

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## REVIEWS.

HOPPE (Cologne). A Physical Explanation of a Case of Apparent Embolism of a Branch of the Central Artery. *von Graefe's Archiv für Ophthalmologie*, lvi. 1.

A woman, aged 32, at the end of her fifth pregnancy experiencing a sudden fright, was seized with palpitation and shortness of breath, while at the same time a "veil" appeared to pass before her right eye. On the following day, when she presented herself for examination, the field of the affected eye was found to be defective as to its upper and inner quadrant, while the lower temporal artery appeared to be blocked, and the corresponding area of the retina œdematous. A continuous ophthalmoscopic examination was now undertaken for an hour and a half, during which time various interesting changes in the affected vessel were noted and jotted down in the form of rough sketches (reproduced in a plate accompanying the original article). The first part of the artery in question, as far as its first branch, a short way beyond the disc margin, was replaced by a narrow, bright line. This remained unchanged. Beyond this point the vessel contained blood, which was venous in colour, and during the whole period of examination the proximal end of the blood-column was seen to move slowly to and fro, each phase lasting about a minute. During the stage of receding the blood column was more or less broken up, either actually divided into discrete columns, or else separated in places from the vessel wall. During the stage of advance the vessel was again apparently full, with the proximal end of the column projecting slightly more towards the disc than before. It was noticed that whenever the patient spoke these movements became exaggerated, and on being told to take a deep breath they were still more marked.

During the night succeeding the examination the patient was delivered of a still-born child. Twenty-four hours later the state of the fundus remained unchanged, but

during the next four weeks further important changes were noted from day to day. On the fifth day after the occurrence of the obstruction the colour of the blood in the blocked vessel was already more arterial, and on the sixth completely so, while the proximal portion, at first represented by a narrow, bright band, was now nearly as broad as the normal artery, and of a pale rose colour. Some minute vessels on either side of the blocked one now became visible for the first time and the field of vision (tested roughly by the hand) was found to be improved. Subsequently the distinction between the first and originally bloodless part of the artery and the distal part became gradually abolished, while, on the other hand, secondary changes were noted, aneurism-like dilatations temporarily involving different parts of the vessel, and subsequently, considerable narrowing of the proximal part. Coincidentally with the stage of dilatation a few small hæmorrhages from a branch were observed, but when the stage of contraction was established the branches themselves had become invisible. The vision, which at first had been  $\frac{1}{2}$ , was at the end  $\frac{4}{5}$ , and the scotoma had much decreased.

In discussing this interesting case, the author dismisses the common theories of obstruction, embolism, thrombosis, and endarteritis proliferans, as alike inapplicable. Given the fact of obstruction to start with, the movements of the blood in the obstructed vessel are easily accounted for. Immediately after the obstruction, the fall of blood pressure in the affected vessel to a minus quantity would exert an aspiratory effect on the blood not only in the veins, but also in the arteries which had any connection with the vessel by means of capillaries. This aspiratory effect would constantly vary with the changes in general blood pressure due to ordinary, and still more to any extraordinary, inspiration or expiration. So far good. It does not, however, touch the initial cause of the obstruction. To account for this, the author suggests that a sudden drop in general blood pressure from any cause, in his case from a fright occurring to a woman far advanced

in pregnancy, is in itself sufficient to produce such a mechanical effect on a healthy retinal artery that the aspiration, instead of sucking blood back from the periphery, sucks in the anterior, unsupported wall of the vessel itself, so that the anterior and posterior walls touch—a sort of valvular closure, which may persist for a longer or shorter time, even after the pressure from behind is re-established.

Now that a diminution in general blood pressure is an important, and probably the immediate, factor in cases of arterial obstruction due to thickening of the intima, is fully recognised, and indeed insisted upon, by Reimar,<sup>1</sup> who discusses these cases, and it may be conceivable that this factor, acting alone, should so act in the absence of any arterial disease.

Though conceivable, however, it seems exceedingly improbable, especially when we consider the comparative rarity of these cases and the frequency of fainting fits; a far more obvious explanation of why this particular vessel and no other suffered, is that it had something peculiar in its structure narrowing its lumen.

It therefore appears quite unnecessary to add another to the various hypotheses hitherto accepted, to account for obstruction of the retinal arteries. On the other hand, it is well that the connection between the general blood pressure and the retinal circulation should be insisted on, as it may have important therapeutic bearings. That capillary anastomosis is important in this connection, is a view which is very much strengthened by the observations made in this case, and the author suggests that methodical slow deep respirations may be able to assist the restoration of circulation in cases of obstruction of a branch, by this means. With the same object repeated paracentesis of the anterior chamber has been recommended. These measures, however, should only be undertaken during the first few days. Afterwards, when the vessel walls have begun to degenerate and stretch in

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<sup>1</sup> *Ibid* OPHTHALMIC REVIEW, April, 1902, p. 100.

places, such measures are inadvisable owing to the risk of hæmorrhage. In this case it was during the second week that dilatation of the obstructed vessel was observed, and also small hæmorrhages from a branch. The author adds, that in cases where the carotid has to be tied, the ligature should be tightened as gradually as possible.

These considerations serve to explain what has often been noticed clinically, that in cases of obstruction of a branch, the immediate prognosis is slight temporary improvement, but owing to the secondary changes in the affected vessel it must always be doubtful how far the improvement can be maintained.

A. HUGH THOMPSON.

KARL HABERKAMP (Bochum). Amblyopia from Filix Mas. *Wochenschrift für Therapie und Hygiene des Auges*, 38, 1903.

ROMEO ROSELLI (Rome). Amblyopia from Chlorate of Potash. *Bollettino dell' Ospedale Oftalmico*, April, 1903.

P. B. WING (Tacoma, U.S.). Amblyopia from Coffee. *Annals of Ophthalmology*, April, 1903.

W. L. BAUM (Chicago). Amblyopia from Oil of Wintergreen. *Ophthalmic Record*, January, 1903.

These four papers on toxic amblyopia from very unusual causes have recently appeared and may conveniently be considered in one group.

One is told in the text-books of toxicology that extract of male fern is apt to produce an amblyopia, which happily is merely temporary; it is fortunate, however, that even a temporary amblyopia is somewhat rare. Haberkamp (Bochum) relates two examples of the occurrence. In the first, a merchant was treated with filix mas on account of the presence of anchylostoma; he was a middle-sized man, in good health and well nourished, though showing the characteristic anæmic, blanched aspect so well known in this condition. The diagnosis being made, he was given

10 grammes of ethereal extract of male fern in capsule, followed by calomel. This was repeated in a couple of days, after which he began to complain of sickness and vomiting, symptoms which of course excited no particular alarm as they are so common in patients under treatment for worms. After another two days a third portion was given. After this the patient became very sick, dizzy and weak, having also severe headache. He was obliged to retire to bed, but in two hours to rise again to go to stool, when he behaved as though drunk. Immediately on getting back to bed he fell into a somnolent state, in which he remained for about thirty-six hours, and from which he awoke to find himself quite blind. He was perfectly sensible and had no pain, the pupils were fully dilated and immobile; ophthalmoscopically, there was venous congestion of the fundus and slight obscuration of the disc margins. Leeching and purgatives constituted the treatment adopted, and four days later he was conscious of light with the left eye. After another four days the right eye had perception of light and the left one counted fingers five feet away. Five or six weeks later the report upon the fundus was that the nerves were extremely pale, while the venous stasis had passed away. The eventual result was about  $\frac{3}{50}$ ; there was no central scotoma and there never at any time had been; the fields were much contracted. Haberkamp's second patient was another man of 47, who also had to undergo treatment for anchylostoma. Alarmed by the result in the former case, the author gave him only 8 grammes as a dose, which was repeated in two days and again in other two. The result upon the general condition was entirely satisfactory, but without any other indication of mischief whatever, the patient found on waking up after the third dose that he was entirely blind. No treatment proved of any avail, and though the patient had plentiful photopsiæ, he never acquired perception of light. With the ophthalmoscope, a grayish red blurring of the disc was observed in the first place, followed in a fortnight by extreme pallor of the discs and shrinking of the arteries.

These are not the first cases on record of poisoning by male fern, but the condition is one of considerable rarity. A point of practical importance is that the active principle of filix is readily soluble in oil, and therefore it may be well to depart from a common custom and rather avoid the administration of castor oil along with or after the extract, and preferably to use calomel, or some other non-oleaginous purgative.

Roselli's case of poisoning by chlorate of potash, said by the author to be unique so far as his search into literature showed, occurred in the person of an Austrian, a young Count who had been spending the winter in Rome. Feeling one day some pain in his throat he sent his servant to procure some lotion for it. This the man did, but owing to his imperfect understanding of Italian, apparently some mistake was made, and three or four times with about two hours' interval between the garglings, the gentleman used, undiluted, the fluid which was supplied. Thereafter he began immediately to feel considerable malaise, to vomit, and to suffer severe pains in the abdomen; at the same time he noticed that vision became very dim, with distortion of objects and a feeling of a mist or fog covering all. Alarmed at this, he sent for the author, who on ophthalmoscopic examination found nothing pathological whatever, save some pallor of the whole fundus; the iris was but poorly responsive to light. The previous day the patient had been perfectly well, had been out hunting, and had eaten somewhat copiously; as his tongue was rather loaded and he had some abdominal pains, the author ordered a saline purge and liquid foods: he knew nothing of the story of the gargle. The next day the patient was much better in other respects but the visual symptoms were not relieved at all, and it was then that for the first time he spoke of the chlorate of potash having been used. On the third day slight improvement in vision began, but objects still appeared confused and distorted; by the end of another week he had recovered so far as to be able again to read the papers.

Wing's case was as follows: A boy of 8 was brought

by his mother, who stated that for the last six months his sight seemed to have been gradually getting worse, so much so that he was unable to attend school. Examination showed a very congested disc in each eye, whose outlines could hardly be distinguished; the retinal veins were large and full, the arteries small, in other respects the eyes appeared perfectly normal. Vision was barely  $\frac{20}{200}$  and the fields were decidedly constricted. The boy had certainly not been smoking, as Wing at first thought might be the case, but neither this nor any other "likely" cause of his evidently toxic amblyopia could he at first discover. His mother then asked if it was possible that too much coffee could hurt him, and informed Wing that the boy took two cups of strong black coffee at each meal without sugar or cream, and frequently had more between times. So this boy of 8 had from six to eight cups of strong black coffee daily. The only treatment consisted in stopping this and giving small quantities of strychnine. In a month vision had again become normal and he was back at school.

Baum gives very brief notes of the case of a man, aged 28, who, while suffering from gonorrhœa, was suddenly seized with severe pain in the right knee joint. For the relief of this he was ordered cold compresses locally and capsules of oil of wintergreen internally. Two days later he complained of headache, ringing in the ears, dizziness, and particularly of yellow vision, and of defective sight. The medicine was discontinued and in five days his vision was again nearly normal. In the two days he had taken thirty-six capsules of oil of wintergreen, each capsule containing ten minims.

W. G. S.

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K. GRUNERT (Tübingen). On Congenital Total Colour-Blindness. *v. Graefe's Archiv für Ophthalmologie*, lvi., 1.

This paper is a most excellent and careful *exposé* of the present state of our knowledge of congenital total colour-

blindness, to do full justice to which it would require to be given in an unabridged translation. After a detailed historical account of the theories advanced for the explanation of the different forms of colour-blindness, a complete analysis of all the known cases is given, and five new cases of the author's own observation are described. A careful study of the whole number of cases, about fifty in all, has led to the following conclusions:—

Total colour-blindness is almost invariably accompanied by reduced central vision, by nystagmus, and by photophobia. It often occurs in members of the same family, also in consanguinity of the parents, and twice as often in men as in women. No connection with hereditary diseases or malformation of other organs could be traced.

With regard to refraction, a low degree of myopia is most frequent, then comes hypermetropia and astigmatism. Glasses do not generally improve the vision. The myopia is probably the result of the (congenital) amblyopia, which from early infancy had caused the patients to bring every small object near to the eye. In one remarkable case the patient was able to *see* Röntgen rays.

The colours appear in all cases only as impressions of light and dark; those at the red end of the spectrum appear lighter, those at the violet end darker than to the normal eye. Pure saturated red corresponds to a dark grey, almost black. The lightest colour is a yellowish green near Fraunhofer's E line in the spectrum. This is quite in accordance with Hering's observations on the white valency of the different colours. The central acuity of vision ranges mostly between  $\frac{1}{5}$  and  $\frac{1}{10}$ . Ophthalmoscopically pale discs and slight affections of the macula have been observed in a few instances only; in most cases, however, the fundus appeared normal. The refractive media in all cases were also of normal transparency.

Of very regular occurrence are photophobia and nystagmus. The former is the most striking symptom of all, increases with increasing intensity of light, and ceases at once when the light is reduced. By feeble illumination the vision of the achromatic eye is equal to that of the



normal eye. We therefore find a poor "light function" on the one hand, and a high, in some instances even normal, "darkness function" on the other hand, as characteristic of total colour-blindness. This led to the assumed existence of an apparatus similar to that of the equally photophobic nocturnal animals, and as such the retinal rods have been interpreted by some, and the visual purple by others. If this be correct, the functions of the retina would be distributed in such a manner that the cones were the terminal organs of the minute form sense and of the colour sense, while the colour-blind rods transmit to us a lower degree of vision. In the daylight their efficiency is far below that of the cones, because the bleaching of the visual purple and the retrogressive products produce in them (*viz.*, the rods) change of form, which reduces their sensibility to stronger illumination. In adaptation to dark, however, where the cones either do not act at all or only very imperfectly, the strong accumulation of visual purple and the resulting change of form increase the sensibility of the rods towards smaller quantities of light, so that they act as a darkness-perceiving apparatus. The eye which is adapted to darkness must therefore be photophobic, because by the accumulation of visual purple it is adapted for smallest stimuli. The photophobia may occur in two different ways: first, the function of the cones not existing, there is the tendency to increase the visual acuity of the rods by shading off bright light and by increasing the accumulation of the visual purple; and secondly, the production of the visual purple is greater in the achromatic than in the normal eye, so that there is always some purple present, even in daylight.

With regard to the nystagmus, this is not quite so constant as the amblyopia and the photophobia. In some instances it has either totally disappeared or decreased with advancing age. The movements are generally short, quick and jerky, and increase during fixation. Often two different kinds of movement occur, the one a slow nystagmus of large amplitude, precisely regular neither in time nor in size, while the eye was not regarding anything

attentively ; the other a quick small movement of perfectly regular amplitude when the eye was fixing.

The explanation for the nystagnus must be looked for in the central scotoma which probably exists in all cases, though it has been possible to demonstrate it only in some instances, and that only with the greatest difficulty, and sometimes only after months of observation. Even in those cases where no absolute scotoma could be found, the central vision of  $\frac{1}{5}$  to  $\frac{1}{10}$  showed the existence of a relative scotoma.

The probable seat of the affection to which we attribute the occurrence of total colour-blindness must be left open to speculation as long as no single case of anatomical examination has been procurable. In his concluding remarks the author points out that the originators of the so-called rod theory have been followers of the Young-Helmholtz theory. They were compelled to build up the rod theory if they did not wish to be driven into the hostile Hering camp. But the latter are also compelled to modify their views, after the accompanying symptoms of central scotoma, photophobia and nystagnus have been found out to be a practically constant occurrence. Their difficulty can be easily overcome by interpreting as "colour-blindness" what has hitherto been considered as total congenital colour-blindness. In that case the assumption becomes necessary that the red-green and the yellow-blue substances are confined to the cones of the retina, but that both cones and rods carry the black-white substance. The rods, furthermore, possess in the visual purple an adaptation and optical "sensibilisator" which enables them to react on the black-white substance even in very feeble illumination, while in daylight they support the function of the cones, but are very much inferior to them in their effect.

K. G.

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LEOPOLD MÜLLER. Detachment of the Retina treated by Operation. *Wiener Klin. Wochenschrift*, April 30, 1903, p. 543.

At a meeting of the k. k. Gesellschaft der Aerzte in Vienna on April 24, 1903, Müller described an operation for dealing with detachment of the retina which he had adopted with good results. In support of the rather heroic measures advocated he argued that procedures undertaken with the object of increasing the volume of the shrinking vitreous having proved futile, it seemed worth while to attempt to reduce the size of the enlarged eyeball.

Müller exhibited a patient on whom he had operated, and referred to six others. The man he showed had had myopia of 9 D. with full acuity of vision in his right eye, his left being congenitally defective. In June, 1901, detachment of retina occurred in the right eye; treatment by prolonged rest and other means was adopted but without benefit. In June, 1902, vision was reduced to seeing fingers in the lower part of the field only; operative treatment was then decided upon. When brought before the meeting ten months later Müller pointed out that (1) the retina was everywhere *in situ*; (2) the field of vision was of full extent; (3) the patient could count fingers at three metres. The defect of direct vision was explained by a small central scotoma resulting from permanent damage to the previously detached macular portion of the retina, and although the patient was unable to read and write he had very useful indirect vision. In two other cases operated on in 1901 the retina was *in situ* eleven and fifteen months later.

Müller's plan of operating is briefly as follows. The outer wall of the orbit is resected according to Krönlein's method; the orbital periosteum is divided vertically and the external rectus muscle exposed; two sutures are passed through the belly of the muscle, which is then divided between them. The temporal side of the eyeball being thus exposed, a piece of the sclera 8 to 10 mm. in width and about 20 mm. in length is removed. Its anterior border should lie 1 to 2 mm. behind the insertion

of the external rectus, its posterior about the equator of the elongated eyeball. Through the edges of the scleral incision about five silk sutures are passed. According to the author, the steps of the operation up to this point should be accomplished without injury to the choroid coat and therefore without any escape of intra-ocular contents.

A narrow knife is passed through the choroid near the lower border of the exposed area, and through this puncture, while the stitches in the sclera are being tightened, as much subretinal fluid is allowed to escape as the reduction in the size of the eyeball necessitates.

J. B. L.

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C. ABADIE (Paris). Chronic Infective Sympathetic Ophthalmia. *Archives d'Ophthalmologie*, May, 1903.

Under this name of a chronic infective sympathetic ophthalmia, Abadie describes a variety of the affection which in certain respects differs from the more classical forms. As will be seen, however, from the description of two cases which he employs in illustration of his point, his selection of a designation does not, perhaps, seem particularly happy, for though the condition may be more chronic and more purely "infective" than the more common variety, yet neither quality can be said to be absent from the type with which one is more familiar. But in Abadie's opinion the peculiar slowness of the onset and the mildness of the affection justify its differentiation. We shall briefly run over the vital points in the two cases which he describes at length.

CASE 1.—Extraction of cataract was performed upon the right eye of a woman of 67 in April, 1900, the left eye was not operated upon because at the upper portion of the cornea there was a grayish infiltrated area which gave the impression, not so much of arcus senilis, as of a pathological infiltration, probably gouty in its origin. The patient, however, was so pleased with the result of operation in the right eye that she was anxious that the left should undergo the same treatment, and extraction was therefore performed a little later. The healing was quite satisfactory, and the

patient obtained good, if not correct, vision in each eye. At the end of seven months she returned because vision had considerably failed for some time; there had been no pain, uneasiness, or injection, and the patient had merely supposed that some alteration in her lenses was required. On ophthalmoscopic examination, the vitreous of the left eye was found to be cloudy, especially at its upper and inner portions; there were no definite floating opacities. In the right eye the posterior part of the vitreous was slightly intransparent, sufficiently so to impart a degree of dimness to the disc margins. The only cause which Abadie could discover for this condition of affairs was the existence, in the region of the operation scar of the left eye, of a furrow, just such a loss of substance as one sees after a nail-scratch. The author considered it probable that through this thinned area, where a shallow ulcer overlay the old scar, an infection from without had obtained access and had first damaged the left eye and subsequently the right by sympathetic inflammation. On this theory, and in order to close the gate of entrance, he applied the cautery gently to the floor of the ulcer, and injected subconjunctivally in each eye a few drops of a very dilute solution of cyanide of mercury. Distinct improvement resulted at first, but later, the little furrow, which had indeed filled up, broke open again; at the same time the vitreous in each eye became more opaque than before, and though there was no injection of the eye at all, vision deteriorated to so great a degree that the patient was only able to guide herself with difficulty. The position of affairs being critical, Abadie, after consultation with de Wecker, decided to repeat the cauterisation, and to close the wound at once by drawing over it a flap of conjunctiva. So soon as this was done the appearance of things began to be better, the vitreous humours began to clear, and eventually became quite transparent, save for a small area, and vision underwent very great improvement.

CASE 2 may be more briefly summarised. It was that of a man aged 48, who had lost the right eye from an injury ten years previously. Up till a year before the present consultation he had had good sight in his left eye, but about that time vision began to fail. For this he underwent treatment at several clinics, but in spite of all which was done his vision became gradually worse, till now he had difficulty in moving about. With the ophthalmoscope diffuse opacity of the vitreous was seen to be present, with a few membranous fragments as well. As in the other case there were no external signs of any inflammatory sympathetic manifestation, no iritis, no turbidity of the aqueous, no exudation in the pupil. The first impression in such a case is that one had to do with an iridocyclitis, but the complete failure of his ordinary method of treatment of such cases, treatment which in Abadie's experience is almost invariably rewarded with success—viz., with injections of mercury, drew his attention to the condition of the other eye, when he found a stump of considerable size whose cornea was for the most part destroyed, with a depressed cicatrix at its centre. The stump was painless and not in the least tender, the tension was normal and there was no injection whatever, but in the

centre of the scar was a part where the epithelium had been abraded. From this point of origin there had been set up a sympathetic affection of the second eye of extremely quiescent character. It was necessary either to close this mode of entrance or to remove the eye, and as the milder procedure would have been attended by no real advantage Abadie decided to enucleate. One week after this had been done vision began to improve again in the other eye, the vitreous began to clear, and in two months the patient had returned to his own work.

Abadie has had under his care other similar cases, but these are he thinks sufficient to prove the existence of such chronic sympathetic infective ophthalmia of a peculiar form. This he believed to take its origin always from an unsound scar, the epithelium of which gives way and permits of the establishment of an "ophthalmia migratoria." The indication obviously is to close the part as soon as possible, and as thoroughly, so that it may no longer be pervious to micro-organisms, and failing this to enucleate. The reviewer has also seen cases which he believes to have had such an origin.

W. G. S.

**A. POULARD.** The Streptococcic Infections of the Conjunctiva. *Archives d'Ophtalmologie*, June, 1903.

The streptococcic infections of the conjunctiva are sufficiently common, but are often unrecognised owing to an absence of precision in their clinical manifestations. Dr. Poulard's observations, founded on numerous cases which he has investigated, may help to put the subject on a more satisfactory basis. He holds that in many cases the streptococcic infection develops where there is some pre-existing ocular affection, such as diphtheritic, diplobacillic, or phlyctenular conjunctivitis, and that it is very probable that it is established only where there is a pre-existing conjunctival lesion. Infectious diseases, as measles and scarlatina, only act by leading to conjunctival lesions which favour the implantation of the streptococci. He suggests the following grouping of the conjunctival streptococcic infections:—

(1) Streptococcic infection of the conjunctiva of lacrymal origin (lacrymal conjunctivitis of Parinaud).

(2) Infection developed in the course of, or following, an infectious disease (measles, scarlatina, diphtheria), this group being closely allied ætiologically to the next.

(3) Infection superimposed on another conjunctivitis as diphtheritic, diplobacillic, or impetigenous.

Dr. Poulard considers that primary streptococcic conjunctivitis is of too doubtful existence to merit a place in this classification.

E. M. LITHGOW.

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FERGUS. *Elementary Ophthalmic Optics.* London: Blackie and Sons, 1903.

If it be remembered that this little book only professes to deal with *elementary* optics as the subject affects the ophthalmic surgeon, it will be found a very useful and clearly expressed manual. In fact its chief feature, and for the purpose a most valuable feature, is just that clearness with which the reader is shown how one step leads to another. His optical guide does not suddenly leave him at some point and become visible again beckoning to him across a raging torrent of algebraical signs strewn with boulders of sines and cosines, but leads his timid feet gently over numerous *pontes asinorum* into lands which otherwise he might never reach. We cannot but think, however, that the author takes too high an estimate of the attainments of the average student when he says his book deals with "those portions of physical and geometrical optics which I consider essential to the medical student beginning his ophthalmic studies." How many ophthalmic surgeons, far less medical students, could pass an examination in the mathematics of optics? In another edition we think the author should include the mathematics of the ophthalmoscope and of retinoscopy, which are not dealt with in this.

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V. MICHEL (Berlin). *Clinical Text-book of Ophthalmology (Klinische Leitfaden der Augenheilkunde)*. Wiesbaden: Bergmann, 1903.

The third edition of this excellent little treatise is before us; it is a scholarly, clear, and moderately brief account of what it is most important to know regarding diseases of the eye. Its chief fault is the total lack of illustrations, but the letterpress is admirably clear and definite in its teaching. Practitioners conversant with the German language will find the book a very useful one to possess.

## OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

FRIDAY, JULY 3, 1903.

Mr. LANG in the Chair.

### CASES AND CARD SPECIMENS.

*A Case of Early Formation of Bone in a Shrivelled Stump.*—Dr. Leslie Buchanan. The patient, a lad aged 17, had suffered from a perforating wound of the right cornea which suppurated. Irido-cyclitis followed, then panophthalmitis, which resulted in a shrivelled stump. The shrivelled globe was removed *ten* weeks after the injury. On examination of the globe after removal a mass of fibrous tissue was found inside it, in which was a nodule of true bone.

*A Case of Keratomycosis.*—Dr. Leslie Buchanan. The patient, a man aged 54, had been struck in the right eye by a piece of straw, which caused a wound which suppurated; an ulcer then formed, accompanied by hypopyon. A grey, slough-like mass formed on the ulcer and extended with it upwards over the cornea, being slightly raised above the level of the surrounding corneal surface. The site of the original wound became clear by separation of the overlying slough. The eye was excised fifty-six days after the injury. Microscopically the portion of cornea which was in process of separation as a slough was found to be completely penetrated by a dense, felted mycelium, most probably of an *aspergillus* type.



*Plexiform Neuroma*.—Mr. W. C. Rockliffe and Mr. J. H. Parsons. This case had been brought before the Society as a card specimen in 1899, under the title of "Pulsating Exophthalmos, Congenital in a Child of 20 months of age." It was then considered to be an arterio-venous aneurysm. In May, 1902, the skull appeared to be enlarging and the posterior fontanelle opening widely. In 1903 the growth had much increased in size, so it was decided to remove it. The carotid was first tied, then the orbit exenterated, when it was found that the orbital plates were missing and that the growth had become adherent to the dura mater. The child died some two weeks after the operation from secondary hæmorrhage. The tumour was found to be composed of masses of convoluted hypertrophied nerves embedded in dense fibrous tissue, which had not only filled the orbital cavity but extended backwards into the skull and forwards into the posterior part of the upper lid giving rise to ectropion. Photographs were exhibited.

*Blood in the Anterior Chamber, following a blow, with Staining of the Cornea, simulating Dislocation Forwards of the Lens*.—Mr. Ernest Clarke. The patient, a lad aged 17, had been kicked in the eye while playing football. When seen two months after the injury, the condition was as described above and exactly as at the present time. There had been repeated fresh attacks of hæmorrhage, as was shown by the fresh scarlet colour of the blood. There was no history of hæmophilia. The tension of the eyeball was increased, and there was no perception of light.

*Anterior Synechia, or Pupillary Membrane*.—Mr. Harold Grimsdale. The right eye had always been defective, but sudden increased failure of vision had recently taken place owing to detachment of the retina. On examination by focal illumination the right eye showed in the cornea, a little below and to the inner side of the centre, a dumb-bell shaped nebula to which was attached a well-marked strip of pupillary membrane. There was an anterior polar cataract in both lenses, but no nebula in the left cornea.

*Tuberculous (?) Choroiditis*.—Mr. Leslie Paton. The patient had noticed that the left eye had become blind some four months ago, without any previous injury to the eye. The

left pupil did not react to light but reacted consensually. On examining the fundus, a large, white, partly translucent mass was seen obscuring the disc, and with coils of blood-vessels over it. A dark patch of pigment was visible at the lower part of the swelling, while from the front of it a greyish veil extended forwards into the vitreous. There was a history of tubercle, and swollen glands were present in the neck.

#### PAPERS.

*Keratitis, with special reference to the part played by the Corneal Cell.*—Dr. Leslie Buchanan. Pointing out that very diverse views were taken by authors as to the part played by the true corneal corpuscles in the formation of cellular exudation in cases of keratitis, the writer stated that his paper was for the purpose of recording the result of his investigations on the subject. Investigations were made in ordinary cases of disease or injury to the cornea. These showed very conclusively that the corpuscles do play a very active part in the process of inflammation of the cornea, also that the changes seen in the more severe cases of inflammation are really identical with those seen in the milder forms, differing simply in degree. In acute cases the cellular elements of the exudate originate in the corneal cells. Sections were made in two planes—at right angles to the surface of the cornea and parallel with it. In the young subject proliferation of the corneal cells takes place constantly. Slides were shown demonstrating the corneal corpuscles in process of giving off buds, which in the next stage become processes; these still later join together, showing also that the cells increase in numbers and that they crowd together, advancing towards the site of the injury or inflammation. Other slides showed the corneal lamellæ pushed apart by œdema and cellular exudation, and the lamellæ themselves partly broken up by penetration into their substance of nuclear matter and masses of granular protoplasm. In some slides large tube-like structures, conical at each end, and composed of numerous nuclei, were noticeable. In cases of chronic inflammation of the cornea an increase in the number of nuclei, together with an increase in the amount of protoplasm with consequent distortion of the lamellæ, appeared to be the rule; in cases of a very chronic nature, however, great distortion of the

lamellæ took place, together with the deposition of lime salts between them and close to the anterior surface of the cornea. The writer considered that the corneal corpuscles played a much greater part in all processes of inflammation of the cornea, as well as in the repair after a passing inflammation, than was credited to them.

*Primary Papilloma of the Cornea.*—Mr. C. W. Dean. This was the report of a case of this somewhat rare affection which occurred in a fisherman, aged 53, who had always enjoyed good health, and had never been troubled with his eyes until some four years ago, when he noticed a minute speck on the inner side of the left cornea, actually on the cornea itself. This had increased towards the pupil and he feared he would lose his sight if it became very large. Mr. T. H. Bickerton saw the patient some little time after this growth had commenced to increase and to invade the cornea towards the pupil, and he had operated upon it, shaving the nodule off with a Critchett's knife till the clear cornea could be seen beneath. The growth when removed had been examined microscopically and it was reported to be "papillomatous with considerable heaping up of horny epidermis."

*Plexiform Neuroma (Elephantiasis Neuromatosis) of Temporal Region, Orbit, Eyelids, and Eyeball. Three Cases with Histological Examination.*—Mr. Simeon Snell and Mr. E. Treacher Collins.

CASE 1.—A woman, aged 25, presented a hypertrophied eyelid, and ectropion at the outer canthus only. The condition was congenital, with no history of any inflammation whatever. It had been removed, but recurrence to a slight extent had taken place.

CASE 2.—In a man, aged 19, the left eyelid, eyebrow and side of face were much hypertrophied. This was congenital, no history of having had any inflammation in this region could be obtained. The cornea was very large; the eyeball occupied the inner part of the orbit.

CASE 3.—A boy, aged 7, had hypertrophy of the left lids, and of the left side of the face. This was congenital, with no history of inflammation. The eye was buphthalmic, the cornea very large and globular. The orbit was much enlarged and the movements of the globe markedly impaired.

Examined microscopically by Mr. Treacher Collins, all

three cases had many features in common, the growth being composed of numbers of much convoluted, nodular, thickened cords held together in a compact mass by loose fibrous tissue. These thickened cords represented hypertrophied nerves, and without much difficulty could be unravelled for considerable distances. In the deeper layers of the skin removed with the growth similar cords were seen, together with enlargement of the superficial papillæ and thickening of the over-lying epithelium. Much thickening of the connective tissue forming the corium was made out. In none of the growths examined was there any definite round-celled inflammatory exudation indicative of preceding inflammation.

The thickened nerve tissue consisted of an outer zone of dense fibrous tissue—hyperplastic perineurium. There was also considerable elongation of the nuclei in the nerve-fibres themselves, with a thickened endoneurium. In the skin of the eyelids the Meibomian glands were widely separated by hyperplastic fibrous tissue. The thick cords were the nerves much elongated and convoluted, with great thickening of the fibrous tissue elements, the peri- and endoneurium.

In Case 3, the ciliary nerves were much thickened and tortuous, and were also nodulated. There was atrophy of the optic nerve with increase of the fibrous tissue in it, together with thickening of the peri- and endoneurium. Out of fifty-eight reported cases eighteen occupied the temple, forehead and upper eyelid, fourteen occupied the posterior part of the neck and behind the auricle, four the nose and cheek, five the region of the lower jaw and anterior half of the neck, eight the breast and back, nine only occupied the extremities. In all the cases there was buphthalmos. Its course is slowly progressive, and if the growth be removed it recurs again in time. In every case the lesion was congenital. With regard to the age of the patients affected, most of the cases were reported in very young children, the number decreasing up to 16 years of age. Males appear to be rather more affected than females, since out of the fifty-four cases reported nineteen only occurred in females, whereas thirty-five occurred in males.

REGINALD E. BICKERTON.

## SOME PRACTICAL POINTS IN THE TREATMENT OF SYMPATHETIC OPHTHALMIA.

BY EDGAR BROWNE, assisted by EDGAR STEVENSON.

A WOUND of one eye may be followed by three-fold consequences to the other : (1) Sympathetic irritation ; (2) serous iritis ; (3) malignant uveitis. The first has this interest in that it indicates that an influence may be transmitted by the sensory nerves without any probability of a transmitted contagion, and therefore the tissues of the sympathising eye may be prepared for the reception of migratory germs. This possible preparation is a point that should not be lost sight of. But in the present communication we are concerned chiefly with the third, malignant uveitis—a slow, insidious, eminently plastic iritis, which resists all the usual remedies, and results in blindness in the great majority of cases. It is now generally supposed to be migratory, and although no specific organism has been discovered, it is a reasonable hypothesis that the infection at the site of the wound is the cause of the inflammation which follows in the sound eye. Allowing for the small differences between a wounded and an unwounded eye, the symptoms and course in both are entirely similar.

The theory of migration is founded on Deutschmann's experiments, but these experiments only prove that certain well-known germs injected into one part of the body may be found in another part. Metastatic panophthalmitis is known to originate from foci at a distance, and not necessarily from the other eye. (Dr.

Abadie believes that an injection into the tissues of the orbit of an enucleated eyeball has an effect on the tissues of the sympathising eye.) So that we have to consider, in addition to the possibility of a migration, the question of an elective affinity for the tissues attacked. Clinical observation shows that the disease originates in the uveal tract, and reappears in the uveal tract.

Assuming a migration, by whatsoever channel, it would seem that we must have either an undiscovered microbe or an irritant poison capable of travelling from one tract to another, capable of irritating the uveal structures, but innocuous to other structures. As an illustration of a disease beginning in one spot and manifesting itself at a place remote from its origin, let us take herpes zoster, which originates in the anterior root of a spinal nerve, does not spread into the adjacent tissues, but sets up a most serious disturbance at its periphery. Of the intervening mechanism pathology as yet has taught us nothing. In like manner we have an inflammation in the *exciting* eye, a similar inflammation in the *sympathising* eye, and a conundrum without an answer in the middle.

It is asserted that irritants which are not bacterial can cause inflammation. Whatever it is that enters the eye is common and widespread, and it does not seem to matter *how* the eye is punctured provided that it is in the dangerous zone. Eyes that are wounded in other tissues escape, provided that the uveal tract does not become involved (as after cataract extraction), but a large proportion of those wounded in the uveal tract give rise to sympathetic inflammation.

The inflammation of the sympathising eye occurs during inflammation of the exciting eye. The inflammation occurring in a wounded eye may subside and appear to have passed away, but it is only dormant, for

an operation performed on that eye for the restoration of vision under aseptic precautions may be followed by an untoward amount of inflammation and sympathetic ophthalmitis in the other eye. Sufficient stress has not been laid on this point in the text-books.

If now we operate on the *sympathising* eye after all traces of inflammation have passed away, we may light up a fresh inflammatory reaction ; this points to the same causes being latent in the wounded and in the sympathising eye, as both behave under similar circumstances in the same manner. If we assume that in the exciting eye an irritant or poison has been introduced capable of exciting an inflammation after lying dormant for some time, it is a fair inference that the same excitant having the same qualities exists in the uveal tract in the other eye. Therefore, operations in the sympathising eye are likely to be, and are notoriously, followed by the same kinds of severe reaction as are shown in the original wounds.

This tendency to inflame of all wounds made in the iris, rendering iridectomies practically useless on account of their closure, is also intensified by the liberation of any lens matter. Lens matter constitutes a source of irritation in all wounds, whether from being an irritant in itself or from affording a favourable nidus.

In quite young subjects, patient and reiterated needling of the lens after the manner of Mr. George Critchett will result in an opening affording passable vision ; but in older subjects, on account of the toughness of the false membrane, &c., the lens does not dissolve with the readiness that it would do in an uninflamed eye. Speaking generally, the lens is less soluble in eyes which have undergone sympathetic inflammation than in normal subjects of the same age, and though perseverance is sometimes unexpectedly

rewarded, we frequently find ourselves obliged to practise removal of the lens. This procedure intensifies the tendency of all openings that we may make to close.

Removal of the lens under these conditions is no easy task, as all the structures are bound together and are excessively rigid. In a typical case which came under care some time after enucleation of the the wounded eye, an incision as for ordinary cataract extraction was made; then an incision was made in the iris as near the corneal periphery as possible, and parallel to the first incision, with a keratome; then with scissors two cuts were made from each end of this wound in the iris down towards the pupil, which naturally was small and fixed; the lens was then forcibly squeezed out with the aid of pressure with the scoop, and a curette introduced into the incisions. The triangular piece of iris was rotten but was partially removed. All this closed up in a few days, leaving a closed pupil and dense false membrane and capsule. This was then taken in hand and needled—in all some twenty-three needlings and stretchings of capsule and membrane—with the result that a reputed blind man was able to earn a living by such light labour as counting bags and entering the results in a book; he was able to write, but not to read ordinary type.

In another case a variation of the procedure was used which is likely to be of practical use, and which it is the main object of this paper to advocate. This was a lad who was wounded in the right eye as a child, from which there resulted a traumatic cataract with posterior synechiæ. So far as he recollects there was no serious inflammation and no involvement of the other eye. An attempt which was made some time after the injury to deal with the cataract resulted in



primary inflammation and sympathetic ophthalmitis of the other eye. Enucleation followed, and after some attempts to deal with the sympathising eye the case was abandoned in despair. He then came to Liverpool, and when seen at the age of 17 or 18 he was then found to have bare perception of light, not even hand-movements. Proceedings were begun by Critchett's method several times repeated, always leading to considerable inflammatory reaction, although any stretching or wounding of the iris was as carefully as possible avoided.

As no benefit resulted, the lens was squeezed out through a T-shaped incision in the iris (instead of a V-shaped.) An iridectomy was then attempted on several occasions, and always failed by reason of the firm closure of the opening made, as the result of a violent inflammatory reaction. (Iridectomies must not be made in these cases in the line of the radial fibres, but a triangular opening should be aimed at, so as to cut across the fibres and give them less chance of joining.)

Pursuing the reasoning indicated in the above remarks, and assuming the existence of an irritant similar in nature to that originally introduced into the wounded eye and liberated by the operation, it appeared feasible to cleanse the field of the operation, and so reduce the irritation to a minimum. To this end a fresh iridectomy was practised and a narrow piece of iris successfully removed, and then a flat nozzle, specially made (similar to Mr. McKeown's, but finer), was used to wash out the anterior chamber with normal saline solution. The irrigation was very prolonged and thorough. The reaction compared with anything that had gone before was trivial: the opening in the iris was maintained, but there was subsequently seen stretched behind it a thin perfectly flat

capsule which looked black by oblique illumination. This was found to be tightly stretched, and when cut through retracted suddenly. An opening remained, and the patient now has very good vision for large objects and for colour, but cannot read any ordinary type. The fact that he has not better vision for smaller objects is due to the condition of his cornea, which is more or less diffusely nebulous throughout. As he has remained more than three years without alteration his condition may be considered permanent.

As not altogether irrelevant a case of double idiopathic iritis may be mentioned. There is a class of double iritis which in its intractability and inveteracy resembles that following wounds. A man, aged about 40, had in early manhood suffered from iritis which had no very acute symptoms, but had left his vision greatly impaired. Year by year it slowly decreased, and finally the pupils seemed utterly closed. Something had to be done for him, and with great difficulty a small piece either of iris or false membrane, or both, was removed and a very small opening made. For some eight or ten years he managed to carry on his business. The left lens was extracted by the same means of which we have spoken. This was followed by considerable inflammatory reaction and complete reclosure of the pupil; repeated attempts to open it only led to inflammation and failure. The experience of the last case was utilised in dealing with the other eye, and a piece of iris cut away followed by prolonged irrigation. The patient now has very fair sight in that eye, with correcting glass, + 6 cum + 1.5 cyl.  $30^{\circ} = \frac{6}{24}$ .

In yet another case—an old sympathetic eye in process of softening—there was a negative result.

As one's resources in these desperate cases are so limited it seems worth while suggesting a trial of this simple plan.

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INTERNATIONAL OPHTHALMOLOGICAL CONGRESS,  
1904.

It is with pleasure that we insert the following circular of invitation to the Congress of 1904.

DEAR SIR AND COLLEAGUE,—The International Congress of Ophthalmology, which was held in Utrecht in 1899, elected Switzerland, as you know, as the country for its next meeting; Professor Pflüger was requested to take the necessary steps.

In answer to the appeal of our colleague, Professor Pflüger, the undersigned ophthalmologists have been constituted the organising Committee of the Congress. They have elected as President the eldest of their Swiss colleagues, Professor Dufour; Vice-President, Professor Pflüger; Secretary and Treasurer, Professor Mellinger, and Professor Snellen, President of the last Congress, our Honorary President.

We are also happy to inform you that the President of the Swiss Confederation, Mr. Deucher, M.D., has very kindly accepted the position of Honorary President of the Tenth Congress of Ophthalmology.

The Swiss ophthalmologists have enthusiastically received the news of the choice with which the Congress of Utrecht has honoured their country. They have gladly joined us, and it is also in their name that we send you, dear Colleague, an invitation to take part in the coming congress.

As the International Congresses of Ophthalmology meet every five years, the forthcoming Congress will be held in 1904.

Lucerne is the town in which the Congress is to be held, the dates agreed upon being September 19, 20, 21. These three days will be devoted to work, the mornings being reserved for *discussions*, the afternoons for practical *demonstrations*.

Scientific congresses have been reproached by some people, and with reason, for failing to attain their aim—the advancement of science. Firstly, it is alleged that they give up too much time to excursions and pleasure. Secondly, the rapid publication of scientific journals renders the long journey almost superfluous if, at the end of it, one only hears communications which would be far better understood by reading; all the more that the excessive number of papers presented at these congresses almost entirely prevents the possibility of discussion, which is the one thing the scientific journal is unable to replace.

In fact, it is the interchange of thought in *discussion* that should be the chief aim and object of these meetings of men cultivating the same science. It is from discussion alone that results the

right comprehension not only of things but also of people, and it is by interchange of ideas that the spark is generated which brings us new light.

We hope, if you will only give us your aid, to render the discussions worthy of the rank they deserve to occupy. We have therefore arranged our *programme of work* as follows:—

We beg those members of the Congress who propose to contribute a paper to kindly send their manuscript at the same time as their admittance fee, *before May 1, 1904*, to Professor Mellinger, Bâle. The paper must be written in one of the four official languages of the Congress, *English, French, German, Italian*, and the length must not exceed five printed pages of the size of the official report of the previous Congresses. Needless to say, the paper must deal with a scientific subject and be worthy of the Congress.

The papers received will be grouped according to their contents and immediately printed. They will form *the first part of the printed report of the Congress*, and will be sent to each member with his admittance card at least two weeks before the time appointed for the opening of the Congress.

In this way each member will be put in touch with the subjects that are to be dealt with, and will therefore be able to prepare himself for serious discussion. By this means the reading out of the papers can be dispensed with. The authors will be called upon by the President to make known in a few words the *results of conclusions* of their papers, upon which the discussion will at once begin if requested by one of the members.

In this way members of the Congress will be enabled to choose for themselves the subjects which most interest them, they can avoid taking part in subjects in which they are not interested, and devote themselves entirely to the subjects they have most at heart.

We thus hope to hear the opinions of experienced men who have not the time to write and publish their experiences and opinions. The discussions will be printed and will form *the second part of the official report*, which will be sent to each member after the close of the Congress.

We propose only one official subject to determine which the great authority of a Congress appears to be particularly necessary.

Subject: "To settle the question of indemnity as regards the value of an eye, lost or injured."

We have asked Professor Axenfeld (Freiburg), Dr. Sulzer (Paris), and Dr. Würdemann (Milwaukee), to draw up a report

on the subject, which will be printed at the beginning of the official report. This subject will be the first to be discussed at the Congress.

It is possible that other papers arriving later than May 1, 1904, may be discussed, and then published in *the second part of the official report*. But this can only be on the express conditions that the discussions on the already printed papers should leave sufficient time, and that these other papers should not exceed the prescribed length. *Of the papers received late only those that have been discussed will be printed.* Manuscripts arriving too late to be presented will be returned to their authors at the close of the Congress. Each paper will be dated on arrival, so as to insure precedence to its author.

Practical *demonstration* is also one of the principal aims of a congress, and is second only to discussion. The afternoons will be given up to practical demonstrations, and we earnestly recommend them to the members of the Congress. The demonstrations of apparatus, preparations, instruments, methods of operations, designs and models of all sorts will be welcome. We would like to bring together at the Congress all objects, old or new, relating to our branch of study. Their enumeration as well as the explanations necessary for their being understood will be added to the second part of the report. As to the *illustrations*, the Congress will only be able to bear the expense as far as its finances will permit. Thus we earnestly hope that valuable work, serious preparation in view of its discussion, an eager attendance at the practical demonstrations and at the exhibition, will give a particular interest to the Tenth Congress of Ophthalmology.

After assiduous work we rightly turn to well-earned recreation. In fact, we do not wish that the scientific part of the Congress should make us neglect its social value. The town of Lucerne proposes to give a reception on the eve of the opening of the Congress, September 18. On September 20 our official dinner will take place.

Thanks to the kindness of the authorities, all that is interesting in this old town will be accessible to the members of the Congress.

We trust that during these last days of autumn the sun will shine with special brightness on this favoured region of our beautiful country.

Full of this hope, we have organised for one of the evenings and for the whole of September 22 a mountain or lake excursion.

The "Lac des Quatre Cantons" Steamboat Company and the railway companies of the Pilatus and Righi have kindly consented

to reduce their charges to half price in favour of the members of the Congress and ladies.

In this way, dear Sir and Colleague, we will do our utmost to prepare for the coming Congress. But its complete success and its usefulness to science will depend on the goodwill of our foreign colleagues.

May our modest invitation be favourably received and induce you to participate in our undertaking.

In the name of the Swiss ophthalmologists we beg you to accept dear Sir and Colleague, the assurance of our highest esteem.

Professor SNELLEN, Utrecht,

*President of the Ninth Congress.*

Dr. BARDE, Geneva ;

Professor M. DUFOUR, Lausanne ;

Professor HAAB, Zürich ;

Professor PFLÜGER, Bern ;

Dr. E. LANDOLT, Paris ;

Professor MELLINGER, Bâle.

P.S.—We will communicate later information in a second circular. But we beg you to consider the arrangements indicated above as definitely settled. An entrance fee of £1, or 5 dollars, will give the right to the official report of the Congress, to the excursions mentioned in this circular (the dinner and the whole day's excursion excepted). Professor Mellinger, at Bâle, is authorised to receive the fee and to send in exchange the admittance card to the Congress.

Any colleagues desiring fuller information can obtain it from Walter H. Jessop, M.B., 73, Harley Street, London ; George Mackay, M.D., 20, Drumsheugh Gardens, Edinburgh ; Henry R. Swanzy, M.D., 23, Merrion Square, Dublin ; Dr. De Schweinitz, 1401, Locust Street, Philadelphia, U.S.A. ; Dr. Coote, Quebec, Canada ; Dr. Alfred Osborne, Alexandria, Egypt, who have been appointed correspondents for the United Kingdom and for the United States.

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## REVIEWS.

F. DE LAPERSONNE (Paris). Spinal Lympho-Cytosis and Ocular Disease. *Archives d'Ophthalmologie*, June, 1903.

In January, 1903, de Lapersonne communicated to the Society of Biology the results in three cases of ocular syphilis in which puncture of the lumbar spinal column had been practised, with the examination of the cerebro-spinal fluid. Since that date Drs. Opin and Le Sourd have pursued a similar investigation in cases submitted to them by de Lapersonne, and the results of their examinations, seventeen in number, are now published.

The cases, of which brief notes are appended, are tabulated as follows:—

|   | RESULTS.  |          |
|---|-----------|----------|
|   | Positive. | Negative |
| 6 Syphilitic optic neuritis and choroido-retinitis (5 cases, but in one a second puncture was made) | 3         | 3        |
| 4 Iritis ... ..   | 3         | 1        |
| 3 Post-neuritic atrophy ... ..  | 0         | 3        |
| 1 Meningitis (tubercular) with neuritis ... ..  | 1         | 0        |
| 1 Cerebral tumour ... ..  | 0         | 1        |
| 1 Ophthalmoplegic migraine ... ..   | 0         | 1        |
| 1 Paralysis of left third nerve ... ..  | 1         | 0        |
| 17  | Total 8   | 9        |

The technique employed is that recommended by Vidal, Sicard and Ravaut; and the writer urges the necessity of following minutely the directions given by these authors. de Lapersonne states that puncture of the lumbar spine is quite harmless; in only one of his cases were there any unpleasant symptoms; the patients were kept recumbent for some hours after the operation. Local anæsthesia was produced by chloride of ethyl. The cellular elements in the fluid were fixed by osmic acid vapour and stained by eosin-hæmatin.

In two cases the operation gave great relief. One of these was a case of cerebral tumour and the removal of a small quantity of cerebrospinal fluid relieved the violent

headache and improved the sight a little. The other was a case of old choroido-retinitis in a passive stage and without pain. The examination of the fluid gave a negative result. The writer thinks the effect of the treatment was chiefly one of suggestion.

In considering the results obtained, de Lapersonne points out that, as stated in his former communication, he had found a condition of lympho-cytosis of the cerebro-spinal fluid in cases of recent syphilitic lesions of the choroid, retina and optic nerve. Of five such cases, positive results were obtained in three. In these three cases the onset of the ocular disease was quite recent (three months, eight days, one month) before the puncture. In the two instances of choroido-retinitis and neuritis in a retrogressive stage the result was negative.

In one case the results of two punctures at an interval of three months were of interest. Examination at the outset revealed well-marked lympho-cytosis; after active anti-syphilitic treatment for three months the cerebrospinal fluid showed no abnormality. There had been coincident recovery of sight. This case seems to indicate that the lympho-cytosis is transitory and present only while there are acute manifestations of the constitutional disease.

In addition to the cases of syphilis, one case of acute tubercular meningitis with optic neuritis gave a positive result. In all the other cases examined, the nature of which is shown in the table, no abnormal condition of the cerebrospinal fluid was present.

de Lapersonne is of opinion that examination of the fluid from the spinal canal may prove of considerable value in the etiological diagnosis of a certain number of recent lesions of the eye. When a syphilitic history cannot be obtained the discovery of spinal lympho-cytosis would determine the line of treatment to be followed. From the point of view of prognosis also, the writer believes in the value of this examination. The rapid disappearance of the lympho-cytosis would be of good augury as to recovery from the ocular disease.

J. B. L.



ROCHON - DUVIGNEAUD and HEITZ (Paris).

Clinical Researches into the Pupillary Reactions among Tabetics. *Arch. gén. de Médecine*, July 7, 1903.

The writers publish the results of their examination of seventy-seven patients, all of whom were suffering from tabes dorsalis; the majority were in the *Hospice de la Salpêtrière* under the care of Prof. Déjerine, and represented all stages and varieties of the disease. The shape of the pupils, their size, and their reaction to light and in convergence were all carefully noted. The condition of the extrinsic muscles of the eye was also examined, and in a number of the cases the acuteness of vision was tested, and the fundus oculi examined ophthalmoscopically.

In noting the reaction to light special precautions were taken. The patient was placed in a completely dark room for several minutes, and the light of a gas flame suddenly thrown on to the eye by a concave mirror: the other eye being excluded from any illumination, forty-eight cases were examined in this way, twenty-nine by ordinary methods.

The authors give the following as the conclusions they have drawn from their study of these seventy-seven cases:—

(1) In 35 per cent. of the cases examined in the dark room, the pupil retained a certain degree of contraction to light and of dilatation to darkness; *i.e.*, an incomplete Argyll-Robertson sign. In only four cases could the reaction of the pupils to light be considered normal.

(2) In 30 per cent. there was bilateral, and in 13 per cent. unilateral diminution or loss of reflex contraction on convergence: this the authors call a "complicated Argyll-Robertson sign."

(3) Myosis regularly accompanies a complete Argyll-Robertson sign: optic nerve atrophy is rarely, and ophthalmoplegia externa or interna still more rarely, found associated with myosis.

(4) Mydriasis is invariably accompanied by the complicated Argyll-Robertson sign, *i.e.*, loss or diminution of

the pupillary contraction in convergence : reaction to light is always abolished in cases with mydriasis.

(5) When mydriasis occurs with retention of good vision and the accommodation can be tested, a condition of ophthalmoplegia will generally be found.

(6) In a limited number of cases in which the accommodation is retained there is loss of the reflex action in convergence : this is generally accompanied by mydriasis.

The authors noted that during a gastric crisis a normal-sized pupil showed marked dilatation ; and they state their belief that there is no constant relation between the stage of the disease and the condition of the pupillary reactions. Herein they agree with the commonly accepted idea that while the existence of the Argyll-Robertson phenomenon is of great diagnostic value, its absence is of comparatively little importance in an obscure case.

J. B. L.

LOUIS DOR (Lyons). Ocular Tuberculosis caused by Trauma. *Revue Générale d'Ophthalmologie*, vi., 1903.

Louis Dor reports a case which, in his phrase, has the value of a laboratory experiment. In a certain house lived a grocer, his wife, and only child, a boy of 4 years ; the parents have not the smallest sign of any tubercular or other taint. But in the house there lived also two phthisical persons, known as such by all the neighbours, who had the reprehensible habit of frequently spitting, not only on the pavement outside the door, but even in the shop as well. In the shop also the child was in the habit of playing. One day the little fellow fell, striking his right eye upon the ear of a wooden horse which he had been dragging about the floor of his father's shop ; keratitis, and then an abscess of the cornea with iritis followed speedily. Dor, who saw the patient first one month after the accident, during which interval he had been under quite wise treatment, did not at first grasp that the case was other than a simple keratitis. However, after another month

there was found to be at the place of injury a swollen scar, thickened, yellow, non-vascular, with a prolongation uniting it to the bound down iris ; tension was below normal and the eye quite blind. With considerable difficulty Dor succeeded in performing an iridectomy, but in three days, as the consequent exudation into the anterior chamber became absorbed, he noticed certain small yellowish elevations which he regards as characteristic of tubercle. In order to make assurance doubly sure he decided to excise one or more of these and inoculate a guinea pig ; this was done, but meantime the tubercles became more numerous until the whole iris was involved. Iodised oil was injected sub-conjunctivally, cod liver oil given internally, and an iodoform ointment employed locally. The little patient was noticed to develop a cough and to be falling off in general condition, and enucleation was suggested, but Dor decided to postpone this till the result of the guinea pig experiment could be manifest. Things, however, went from bad to worse, and enucleation was only postponed now till the effect of injection of air into the vitreous was tried. This raised the tension almost to glaucoma point, but it became quite evident that enucleation, so long (and in the reviewer's opinion so improperly) delayed, must be performed. On section the whole ciliary body was found to be invaded by tubercles, and to a less extent the choroid also. Dor estimated that in the eye there were not fewer than 10,000 giant cells, and regarded the specimen as a most typical and unmistakable one of general tuberculosis.

The guinea pig which had been inoculated became tuberculous also.

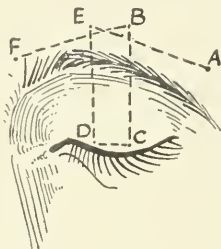
The case, thus described, of virulent tuberculosis in a healthy child following upon a wound of the eye, ought to form, as Dor most truly insists, an additional spur to urge us to strive for the enforcement of the rule of " no spitting " in confined places. As he also remarks with truth, as long as the non-tuberculous continue to do so, so long will the tuberculous also.

W. G. S.

N. B. HARMAN. An Improved Method of Operation for the Relief of Ptosis Palpebræ.

At the recent meeting of the British Medical Association Mr. N. Bishop Harman (London) read a paper on this subject.

Present methods, he said, might be summed up under three groups: (1) attachment of the drooped lid to the superior rectus (Motais), in some respects an ideal proceeding, but one which commonly failed by producing diplopia and leaving the globe exposed when upturned in sleep: (2) plastic operations such as that of Panas, which had the disadvantage that in the not uncommon event of failure scars were added to the patients' already marred



features; and (3) the provision of an artificial fronto-palpebral elevator by attaching the frontalis muscle to the lid margin by a wire, the device of Mules. This was the most practicable method, but it had the objections of requiring the splitting of the lid margin, causing a permanent stiffening of the lid so that it could not be subsequently everted, leaving an irritating knot above the brow, and that the wire, being smooth and unsociable, remained a foreign body and liable to expulsion. Mr. Harman had overcome these objections by the adoption of a fine gold *chain*<sup>1</sup> of great strength, slenderness and flexibility. The

<sup>1</sup> The chain can be obtained from Messrs. Weiss, Oxford Street, London.

operation gave rise to no other damage to the tissues than that of the needle punctures. He secured fixity of the loop by burying deeply lengths of the chain above and parallel to the brow. He believed the growth of connective tissue around and within the links of the chain would foster the production of a veritable connective tissue tendon, so that the artificial support of the chain would be of secondary importance. In placing the chain in position it was attached to a "triangular four inch needle" by a soldered link or a knotless silk loop; the method of emplacement can be followed by reference to the diagram, which has been kindly lent by the *Lancet*.

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HURD AND HOLDEN (New York). Embolism of Central Retinal Artery following upon Injection of Paraffin into the Nose. *New York Medical Record*, July 11, 1903.

Hurd was consulted by an Italian, aged 32, who wished him to try to improve the aspect of his nose by means of paraffin injections, of the benefits of which he had heard. He had a well-marked saddle-nose, consequent upon an abscess from which he suffered at the age of 16. He had had gonorrhœa several times, but there was no distinct evidence of syphilis. The actual cause of the deformity appeared to be the loss of part of the cartilaginous septum. In October and November, 1902, injections were made without any untoward symptom, and in April, 1903, a third time he underwent the treatment, being still unsatisfied with his appearance. A mixture of paraffin and white vaseline, the whole having its melting point at 110° F., was injected, without the previous use of cocaine, the needle being introduced first at the tip of the nose and pushed upwards an inch, and then introduced at the root of the nose and pushed downwards to a spot just above the former injection. At this time the patient was observed to rub the right eye, and in response to question, found he was quite blind of it. A little later ecchymosis appeared at the tip of the nose, indicating that a vein had been punc-

tured. Within half an hour he was examined by W. A. Holden, who confirmed that though the patient had subjective sensations of objects, he had no real perception of light. The media were clear, the retina was not hazy, and the retinal veins were normal in aspect. The main inferior branch of the central retinal artery and its divisions were, however, empty and collapsed, and only to be recognised by the faint white outline of their walls. The main superior branch contained some blood, but when gentle pressure was made upon the eyeball the blood column in it broke up and the blood flowed back to the central artery. In the hope of re-establishing circulation by encouraging the heart, and at the same time dilating the peripheral vessels, digitalis and nitrite of amyl were both administered, while the eye was alternately pressed back into the orbit and released, with the view of dislodging the embolus from its place and assisting its onward progress. The only effect of this massage, however, appeared to be that in a few hours the retina was found to be entirely deprived of blood, none having reached the arteries, and what was in the veins having been squeezed out of them. Somewhat later the typical œdema of the retina and the cherry-red spot at the macula appeared. No vision was ever obtained.

The only case of blindness consequent on paraffin injection which the authors have been able to discover in literature was that of Leister, but in that instance the general symptoms (collapse requiring artificial respiration, &c., and continuous vomiting for hours) were entirely different. In Leister's case it was believed that the dorsal vein of the nose had been punctured and a thrombus had thus reached the ophthalmic vein, into which it flows. The symptoms were consistent with this, or with thrombosis of the cavernous sinus, but why a thrombus should be arrested in a larger vein than that in which it took its rise is not explained. In the present case it seems passing strange (taking it for granted for the moment that the pathological diagnosis is correct) that an embolus should start in the nose, make its way to the heart, pass through

the capillaries in the lungs, and return to the eye, there blocking the central artery of the retina. It hardly makes the theory more plausible to suggest, as Dr. Evans did, that there might be a patent foramen ovale through which the thrombus slipped from one auricle to the other.

The simple conclusion at all events is that without extreme care it is not right to employ paraffin injections.

W. G. S.

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**E. KALT.** Primary Band-shaped Opacity of the Cornea. *Annales d'Oculistique*, May, 1903.

Kalt records a typical case of this affection, and gives the results of his examination of portions of the cornea which he removed by means of a Graefe knife with the view of improving the vision. It is the only case, so far as he knows, that has been observed in the first stage, that is, before secondary reaction has occurred, as in Leber's case.

The thickest pieces removed from the cornea included the epithelium, Bowman's membrane, and the most superficial layers of the corneal substance. The deep cells of the epithelium were notably diminished. There was no increase of the fixed cells of the parenchyma; no migratory elements in the corneal spaces. Bowman's membrane and the base of the elongated cells of the epithelium contained a granular substance, which had a grey appearance in unstained sections, and which stained deeply in others with hæmatoxylin and thionin, disappearing after immersion in rubin and picric acid.

Acetic acid did not cause the granular mass to disappear, and no bubbles were liberated. Sulphuric acid caused no further change; but hydrochloric acid cleared it instantly.

The author concludes that the band-shaped opacity is produced by an infiltration of a concentrated solution of phosphate of lime between the epithelium and Bowman's membrane. This salt is probably kept in solution by carbonic acid. A precipitation results when this gas

escapes, and the deposit may remain for an almost indefinite time without causing any reaction in the corneal elements.

The history of this case accords with the view suggested by Nettleship, that the gouty diathesis is an element in the causation of this affection.

Kalt gives the following explanation of the situation of the band-shaped opacities:—Since they have a transverse arrangement and never occupy the upper third of the cornea, it can be supposed that the repeated pressure of the upper lid on the cornea produces on the superficial layers of this membrane an agitation which causes the precipitated calcareous particles over the whole extent of the cornea to descend. An opposite effect is produced by the movements of the lower lid, but naturally it is diminished by the narrowness and frequently relaxed condition of the lower lid, and perhaps also by gravity.

In this explanation no account is taken of the hypothetical phenomenon of concentration of the lymph circulating in the cornea.

C. H. U.

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**G. CORDA (Pisa). Posterior Polar Cataract caused by Iodism.** *Annali di Ottalmologia*, 5 and 6, 1903.

As symptoms of iodism, produced by excessive dosage with iodide of potassium, or by moderate quantities in persons unusually susceptible to that drug, conjunctivitis, blepharospasm, and œdema of the lids are not infrequent, but Corda has not been able to find any record in literature of a similar occurrence to that which is about to be related, though other substances which, like iodide of potassium, act by deprivation of moisture, such as naphthalin, glucose, &c., have the power of producing cataract and have, as is well known, been utilised experimentally for this very purpose by a number of observers who have administered one or another subcutaneously, in the conjunctival sac, in the anterior chamber and so on. The fact that in this solitary instance cataract was produced in man during the



administration of iodide makes it so much the more singular that considering the large number of cases of iodism the accident does not occur more frequently.

A man of 43, from Guardia, presented himself at hospital suffering from progressive defect of vision in both eyes; he appeared quite well and healthy, but had constant blepharospasm so severe that it was extremely difficult to obtain a view of the eyes, with hyperæmia of the conjunctiva, but the corneæ were transparent and normal looking; there was also extreme myosis. He had never suffered from any serious disease, but being very stout he had been advised by a friend to take iodide of potassium, and had begun six days previously to endeavour thus to reduce his weight. He had taken the drug in the form of a concentrated solution (equal parts of iodide of potassium and distilled water), in five minim doses the first day, the dose increasing by five minims each day. On the third day he began to feel severe muscular pains in the feet, and on the following day his whole legs were similarly affected. On the sixth day somewhat suddenly lachrymation began, followed rapidly by photophobia and by such blepharospasm that he became unable to move about. Corda at once suspected iodine poisoning, and administered cocain locally, which enabled him to obtain relaxation of the violent blepharospasm. Next day, the patient having ceased to take iodide, he was examined more fully, when it was found that though blepharospasm and photophobia were gone, there was serious reduction in vision. This was found to be due to a central semitransparent "disc" in the centre of the capsule of the lens, which was small enough to permit of the existence of a narrow space of perfect transparency between the "disc" and the pupil margin when the patient looked upwards or downwards; its margin was irregular, almost dentate. With pupils dilated by atropin the patient could only count fingers at a couple of metres. In a few days he returned with vision much improved: indeed he was able to read  $\frac{5}{7.50}$  with each eye without correction. On examination with the ophthalmoscope no trace could be found of the opacity previously existing,

and the fundus was perfectly normal. At the end of another fortnight his vision was  $\frac{5}{5}$ .

The condition giving rise to the temporary opacity seems to have been an alteration of nutrition of the lens at its posterior pole, which fortunately had not gone beyond the limits of possible recovery; Corda considers it to have been attributable to the dehydrating effect of the iodide.

W. G. S.

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**ELSCHNIG (Vienna). Glaucoma after Cataract Extraction.** *Klinische Monatsblätter für Augenheilkunde*, March, 1903.

This paper is based upon the account of a case in which, after extraction of cataract, glaucoma resulted from the surface of the anterior and posterior chambers becoming covered with epithelium. The patient had been operated upon for cataract a year previously in another clinic, and the healing was said to have been complicated by bursting of the wound. A month after leaving hospital a very severe attack of glaucoma occurred. The condition persisted, with remissions and exacerbations, for nearly a year, when the eye was enucleated and a complete microscopical examination of the eye made. The incision had been irregular, and its upper part lay about 4 mm. in front of the corneo-scleral junction. The lateral parts of the incision were sclero-corneal and the cicatrix cystoid in character. The filtration angle was closed in the upper part of the section by the iris lying pressed against the cornea. The inner surface of Descemet's membrane was found lined by epithelial cells in one or more layers. This epithelial covering was continued over both surfaces of the iris and over the secondary cataract. The normal endothelial lining of Descemet's membrane had totally disappeared. Elschmig considers that the abnormal ingrowth of epithelium could only be derived from the epithelial cells of the corneo-scleral margin, although a direct connection between the epithelium inside and that outside the eye

could not be made out microscopically in the sections. He supposes that the epithelium of the corneo-scleral margin grew through the irregular wound into the anterior chamber, and there underwent further proliferation to produce the pathological conditions observed.

J. V. PATERSON.

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**CLAUD WORTH.** *Squint: its Causes, Pathology and Treatment.* London: John Bale, Sons and Daniels-son, Ltd.

So far as concerns convergent concomitant strabismus we have found Mr. Worth's book to be an excellent treatise on the subject of squint. His conclusions have as their basis the painstaking examination of many hundreds of cases with the careful preservation and comparison of records. His great thesis is that "the essential cause of [convergent concomitant] squint is a defect in the fusion faculty," hypermetropia and other conditions being non-essentials. Should this sense be defective, hypermetropia and a number of other conditions may take their part in assisting to disturb and to terminate binocular vision and even binocular fixation, and so squint is established. Fortunately this sense, if the patient is taken in hand sufficiently early, may be trained to much greater perfection, and a strabismus which is not too fully established prevented or cured permanently. For this purpose Mr. Worth advocates the use of a modified form of stereoscope, or to be more correct, an instrument for encouraging the simultaneous perception of macular images, which he names (with a classical inaccuracy which is painful) an amblyoscope; with this he obtains good results as his recorded cases show completely, given that the condition is in a sufficiently early stage. He is also an advocate for the wearing of correcting glasses even in very early childhood or infancy, and is a strong believer in the education of the squinting eye, which he accomplishes by his amblyoscope, by correction of refractive errors, by employing atropine to the fixing eye only so as to raise relatively the

value of the strabismic one, and by continuous shutting off of the fixing one for a number of days.

Mr. Worth has made a diligent study of the development of fixation, binocular vision, &c., in infants, and believes himself able to speak with confidence about the dates at which these develop, and his remarks thereon are of much interest. He is of opinion that no infant is too young to wear glasses in whom the need for them can be found to exist, and he in practice orders them for infants whose lives are only measured by months.

Of course there is but little essential difference between the "fusion faculty" of Worth and the "desire for binocular vision" with which one has been more familiar, but he has a pleasant, clear, frank and earnest way of dealing with his subject which is very convincing and attractive. We do not mean that we agree with all he says, for example, on the subject of the later results of tenotomy. If he is justified by his experience in his strictures thereon we are glad that our own is very much more happy. He has a method of his own (not very different from what has been recommended by others) for the performance of advancement, the diagram of which is not correct to the description.

With one thing in the book we regret to have to express disapproval, the use, namely, of the word "monolateral." Monolateral is absolutely indefensible, a word beginning in Greek and ending in Latin, a word which Macaulay's proverbial schoolboy would have been flogged for suggesting. Our profession has not a high reputation for scholarly attainments, and we ought not to be too pedantic, but why Mr. Worth, when the word "unilateral" exists, and stands ready to his hand, should go out of his way to employ so horrible a mongrel, we cannot imagine. We trust no one else will adopt it, and that Mr. Worth will drop the expression. Amblyoscope is bad enough, for though the components are both from one language, they do not express Mr. Worth's meaning in the least, as anyone with even a smattering of Greek could have told the author, but monolateral is disgraceful.

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HIGGENS. *Ophthalmic Practice.* London: H. K. Lewis, 1903. *Second Edition.*

"This manual is intended entirely for students and general practitioners, it does not pretend to go deeply into the subject, but merely to give as much information as is likely to be useful to those still engaged in their studies or in general practice." So runs part of the preface. We are therefore not to expect to find any discussion of the pathology of the subject, and there is none. But even within the limited range which thus remains there are serious omissions and weak points. Take first the case of hypopyon keratitis—an essentially practical matter for the general practitioner; of this there is only an inadequate and confused account which he would find of little service. Paralysis of ocular muscles is most inefficiently dealt with, and not quite accurately; to judge from what is said and left unsaid the reader might imagine that no one of the exterior muscles supplied by the third nerve could be paralysed without all being affected. Perhaps a student or general practitioner might be most likely to wish to read the section upon Optic Neuritis in a book with such a preface: he will find the information here meagre and trifling. He might wish to see from what lesions his patient with diabetes is liable to suffer: he will obtain no assistance whatever; the disease is mentioned once only so far as we have been able to find. There is absolutely no reference to diabetic retinitis, to diabetic paralysis of muscles, to diabetic iritis, to diabetic cataract, or to diabetic amblyopia. Under the head of detachment of retina there is no mention of sarcoma of the choroid; under Diseases of the Choroid also one looks for it in vain; only under the title of Tumours of the Eye there is an inept paragraph, or rather sentence, on the subject. Tumour of the optic nerve is not mentioned anywhere. In the section on Optic Atrophy the fact that the fields of vision are restricted is not considered of sufficient moment to be accorded any mention; under Glaucoma it is stated that "the field of vision will be found to be limited:"

nothing more. In the index, which even in other respects is indifferent at the best, there is no reference whatever to tabes, to diabetes, to acromegaly, to disseminated sclerosis, or to general paralysis.

In the division into sections there has been grave carelessness; thus, for example, presbyopia finds itself of all places in the world under "Myopia and Astigmatism." The grammar in a number of places is incorrect, and the punctuation so bad as to sometimes confuse the sense. An endeavour has been made, says the author, to bring the book "thoroughly up to date"; the endeavour, however, has been singularly unsuccessful, as the following three points will indicate:—Extraction for myopia is dismissed with a very few words, and is not really explained; there is no mention of protargol or any of the newer silver products; and the ophthalmometer is not so much as named. In short, we find the book to be far from satisfactory.

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### CLINICAL NOTES.

**BILATERAL BLINDNESS FOLLOWING MEASLES.**—Measles is—fortunately—very rarely accompanied or followed by loss of sight, either temporarily or permanently, apart from the frequent inflammation of conjunctiva and cornea. This loss of sight, when it does occur, may be due in some cases to the presence of a complicating nephritis, at other times to a toxic retrobulbar neuritis; it appears also to have been due to a cortical lesion. The case which Rollet (Blois) reports is that of a girl of 13, of peasant parents; in the course of an epidemic in her neighbourhood she became attacked by measles in May, 1902. The disease ran its usual benign course, and the patient was up and out of doors again without any sign of trouble in the eye. But one day while sitting under a tree she felt somewhat drowsy, dropped off to sleep for a very brief period of time, and on awaking found she was blind. When Rollet saw her the pupils were dilated enormously, so much so that he thought at first that atropin had been instilled. The only patho-

logical condition he could discover was in the optic discs, which were of a yellowish-orange colour, dull and almost waxy looking; all the vessels were much reduced in size. The whole of the fundus had some of the waxy yellow look save at the macula and round the disc, where the tint was rather grayish. There was no sign of choroidal mischief, and no pigment whatever in the retina. Vision was  $\frac{4}{50}$  and the fields extremely small; whether there was a central scotoma or not could hardly be ascertained. The changes in the fundus looked as though of some standing, yet the patient adhered firmly to the account given above; there was a trace of albumin in the urine, but no other suggestion about the patient of uræmia. When seen some months later there was a development of pigment strongly suggesting retinitis pigmentosa; vision never returned to the slightest degree.—*La Clinique Ophthalmologique*, July 25, 1903.

DOUBLE OPTIC NEURITIS IN WHOOPING COUGH.—The case observed by Gamble (Chicago) was that of a girl of 8, who was brought on account of subconjunctival ecchymosis of the right eye, due to whooping cough. She had been whooping for four weeks, the mother said, and the seizures, especially the nocturnal ones, were very severe. In each eye vision was  $\frac{20}{15}$ , and except that the pupils were rather insensitive, nothing seemed to point to any serious condition till the fundus was examined, when blurring of both discs was observed. Two months later the neuritis was still quite pronounced, and it was not for six months that the discs could fairly be said to have returned to their normal state. Fortunately vision was quite unaffected. There were no indications of any cerebral disorder at any time, and Gamble seems disposed to argue that possibly the toxins of whooping cough may have acted directly upon the nerve head.—*American Archives of Ophthalmology*, July, 1902.

YOHIMBIN.—Yohimbin, though known for some years in other departments of therapeutics, has but recently come into notice as a local anæsthetic calculated to be of service

in ophthalmology. It was "discovered" for this purpose, we are told, by Magnani, of Turin, who published a paper on the subject last year. He found that a 1 per cent. solution of the hydrochloride dropped into the conjunctival sac caused in one minute (after a momentary feeling of burning) anæsthesia of the conjunctiva, followed after five minutes by anæsthesia of the cornea. After another five minutes this anæsthesia rises to its maximum and lasts for about half an hour. At the same time there is some hyperæmia of the conjunctiva, which, however, can be readily controlled by suprarenal extract. Accommodation meantime remains intact, and though the movements of the iris are sluggish they are not altogether lost. As an anæsthetic it has two advantages, the long continuance, and the non-interference with iris and accommodation, and two disadvantages, the hyperæmia induced, and the high cost. With most of these observations Salomonsohn agrees, but he has usually seen some dilatation of the pupil, though this does not come on for some time; it is never of high degree, and pupillary reaction takes place as usual. So far as he has observed there is not the slightest reduction in the amplitude of accommodation; he does not find that suprarenal extract is of any avail to combat the hyperæmia produced by yohimbin, a hyperæmia which interferes gravely with the utility of this anæsthetic for operations on the eyelids. Apparently yohimbin has no toxic properties such as cocaine possesses, which is a point in its favour.—*Wochenschrift für Hygiene und Therapie des Auges*, xxviii., 1903. *Annali di Ottalmologia*, v. and vi., 1903.

**MOUNTING SPECIMENS.**—Morton recommends a method of mounting naked-eye specimens which seems to be rapid, satisfactory and neat; it was learned from Greef. The steps are briefly: Harden the specimen in 10 per cent. formalin for from two to four days; cut it in the way best calculated to show the condition; wash in distilled water for ten minutes and then dry carefully with a cloth or small brush; make it fast to the back of the glass mounting jar (one side at least of which is flat) with a little gelatine;



when it is quite dry—a matter of a minute or two only—fill the jar with 10 per cent. formalin (watery solution); thoroughly dry the top of the cell and fasten down with gutta-percha cement; lastly, paint round the edges and over the gutta-percha cement with any oil paint. To prepare the gelatine, it should be simply mixed with a little water and kept warm over night. If the gelatin, the formalin solution and the gutta-percha cement are all ready prepared, the whole process takes a very short time.—*Ophthalmic Record*, January, 1903.

FATAL HÆMORRHAGE FROM THE CONJUNCTIVA.—The infant in whom this occurred was born of a mother, aged 22, who was at the time suffering from chancroids and gonorrhœa. So far as could be ascertained there was no history of hæmophilia, either on her side or the father's. Immediately after delivery two drops of a 2 per cent. solution of nitrate of silver were instilled into the child's eyes. On the following morning the eyelids, face and pillow were covered with blood; by afternoon of the same day this had occurred again, and the palpebral conjunctiva was covered with a white membrane. Adrenalin solution (1—3,000) every three hours, iced water applications, firm bandaging, alum stick, pure adrenalin powder, gelatin solution, all were tried in succession, but all without any more than merely temporary avail. All the while the child seemed perfectly well save for the rapidly increasing anæmia, but it (the sex is not stated) died in exactly one week from birth. *Post-mortem* examination failed to show any diseased condition of internal organs whatever, and there were no internal hæmorrhages.—Wiener, *American Journal of Ophthalmology*, March, 1903.

BENZOATE OF LITHIA IN TREATMENT OF OPACITIES OF CORNEA.—Attracted by the well-known solvent powers of lithia in cases of chalky deposits elsewhere, and taking note of the frequency with which lime salts are found in the chemistry of corneal opacities, Mazet (Marseilles) has made tentative use of it in certain suitable cases. He employed it locally, after some preliminary uncertainty, in

solutions of  $2\frac{1}{2}$  to 10 per cent., and reports that he has obtained most satisfactory results, and that he has obtained them comparatively quickly. He thinks it acts probably by becoming broken up by the action of the tissues into formic acid and then into water and carbonic acid; this acid gives to the solution its solvent power over chalky substances. In addition there may be a direct action, as both carbonate and phosphate of lime, insoluble in water, are dissolved at once by a watery solution of benzoate of lithia. It dissolves also both uric acid and urates, and is thus useful in definitely gouty affections. The application is not painful.—*La Clinique Ophtalmologique*, May 25, 1903.

**SUBENUCLEATION.**—By this term Nicati means a method of partial enucleation which he has devised; he was partly led to suggest it by finding that in cases in which he had employed subconjunctival injections but had found himself afterwards obliged to enucleate, the conjunctival sac was so altered by the previous treatment that it was difficult to insert an artificial eye of proper dimensions. His method is to make a button-hole over the internal rectus, divide the tendon close to the sclera after introducing a stitch by which it can afterwards be picked up, enlarge the button-hole upwards and downwards sufficiently to enable him to draw forwards the posterior part of the globe and divide the optic nerve and the oblique tendons, cut off the posterior "half" of the ball just behind the insertions of the recti, and empty the anterior hemisphere; he then stitches the severed internal rectus again in place, and finally closes the conjunctival wound. The cornea is thus left with the whole conjunctiva attached to it. It is true that the cornea atrophies, but the appearance and mobility of the stump are superior to what can otherwise be obtained. He believes, too, that there is no reason to dread sympathetic trouble, and asserts that the healing is more rapid than after an ordinary enucleation, of which surprising assertion he adduces no proof.—*Archives d'Ophtalmologie*, June, 1903.

## AN OPERATION FOR PTOSIS.

BY H. COLLEN ENSOR, M.R.C.S.

OPHTHALMIC SURGEON TO THE CARDIFF INFIRMARY.

A CASE of complete unilateral congenital ptosis presented itself at my out-patient department at the Cardiff Infirmary early this year, and with a view of obtaining a more symmetrical appearance of the face, and a more lasting effect than is frequently the case with other operations, I decided to try a new operation, of which the following are the particulars :—

Annie D., aged 9, was admitted into the Cardiff Infirmary on April 28, 1903, with excessive drooping of the right eyelid. The hair having been shaved from the eyebrow, chloroform having been administered, and the eyebrow being slightly raised, an incision was made down to the periosteum covering the supra-orbital ridge, from the internal to the external angular process, the skin being held so that it should be cut just below the part from which the hair had been shaved. A second incision was made (through the skin only) from the extremities of the former incision and below it, so as to enable me to remove a portion of the skin with sharp pointed scissors, about 5 mm. broad at the inner side and 7 mm. broad at the outer side. The object of making the flap of skin broader at the outer than at the inner side was to secure more shortening of the lid there, where the tissue is more abundant, and where the action of the occipito-frontalis muscle is not so great. There

was a little hæmorrhage, which was stopped by the cautery at a dull red heat.

Paquelin's cautery was then applied to burn the tissues at the upper part of the wound, thus charring the tissues down to the supraorbital ridge along its whole extent. The cautery was also passed over the exposed surface of the orbicularis palpebrarum, with the object of weakening the sphincter muscle. The wound was then dressed with boracic acid ointment and allowed to granulate slowly. It was healed up in about three weeks, and the patient was then discharged.

On July 14 the patient was readmitted as, though the patient's friends were very pleased with the operation, I thought further operation would still further improve her appearance. At this time the hair had grown again on the eyebrow, the tissues of which were partially fixed to the periosteum. There was a scar about 3 cm. long and 2 mm. wide, but separated from the hair on the eyebrow by about 2 mm. of healthy skin. The margin of the eyelid could be raised above the upper border of the pupil. The eyelids could easily be closed.

July 17. The child was again put under chloroform, and an incision again made immediately below the line of the hair and another below the scarred surface. The intervening skin and cicatrix were removed with the scissors, and the upper part of the wound again cauterised down to the periosteum of the supraorbital ridge.

The object of this second operation was to still further fix the supraorbital tissues to the periosteum and to draw up the scarred surface more immediately under the hair of the eyebrow, so as to ensure that more of it should be hidden when the hair grew again. The wound was plugged for a couple of days and dressed as before.

On July 30 the wound was healing well, and there was every promise of the eyelid being permanently elevated.

My objects in planning this operation have been, in addition to the relief of the ptosis :—

(1) The procuring of a more or less symmetrical appearance of the face by preventing the eyebrow of one eye being perpetually raised more than the other.

(2) The hiding of the scar by getting it fixed immediately below the hair of the supraorbit.

(3) The formation of a fixed groove under the eyebrow (tarso-orbital groove), instead of the appearance of a vertical band produced by the constant action of the occipito-frontalis muscle.

## A CASE OF RECURRENT PARALYSIS OF THE THIRD NERVE.

BY WILLIAM GEORGE SYM, F.R.C.S.ED.

INSTANCES of recurrent paralysis of the third nerve are from time to time reported, and I do not affect to consider that which I am about to relate as an unparalleled example, but the definiteness of the apparent cause of the recurrences makes it at least somewhat outside the usual run, for as a rule there is little to guide us as to the true cause of the repetition of the paralysis.

Mrs. X., a strong, healthy woman aged 36, consulted me at Leith Hospital in 1901. Her personal history is as follows: She was married in November, 1889, and during the first three pregnancies, the births occurring in 1890, 1892, and 1894, there was no complaint in regard to the eyes. Her fourth child was born on February 6, 1896, and during the last month of her pregnancy sight,

she says, was dim ; for the last fortnight she had double vision. These symptoms passed away entirely in less than a week after the confinement, and did not return till the next pregnancy. Early in her fifth pregnancy (the child was born in December, 1898) her eyes became tender and a little painful, and she was advised to wear the correcting lens for her hypermetropia. For six weeks before this confinement there was double vision, and the left eyelid began to hang down, but according to her story never sufficiently so entirely to conceal the pupil. Again spontaneous and complete recovery took place by the time the baby was a week old, or very little more. Nine or ten weeks before the close of the sixth pregnancy diplopia came on again and the lid began to droop. To save repetition it need only be stated that the condition was very similar to what had been the case in the previous pregnancy, save that the pupillary paralysis was somewhat greater and the ptosis more complete. This child was born in March, 1901.

At this time I saw her and found the right eye to be entirely normal save for the presence of some hypermetropia ; when this was corrected she had full vision. On the left side she had almost complete ptosis ; any movement of the upper lid which took place at all was accomplished by the occipito-frontalis ; the upper two-thirds of the cornea could not be uncovered. The pupil was slightly dilated, not dilated to maximum by any means ; it contracted very slightly to light. The ciliary muscle appeared completely paralysed. V. =  $\frac{20}{200}$ , but with + 2.75 D. she obtained  $\frac{20}{20}$  ; with + 6 she could read J. 1 fluently at 8 inches. The globe stood in divergence, movements upwards and inwards were completely abrogated ; outward movement was not altogether lost, but was very limited in degree, showing that the paralysis of the sixth nerve was not quite complete, though almost so ; movement inwards (to right) was almost entirely intact, and occurred also strongly on any attempt to look upwards, upward movement being quite impossible. So

far as I was able to make out, the superior oblique appeared to be entirely unaffected. The fundus of each eye was quite normal, and no motor or sensory nerve other than those mentioned seemed affected. The only other complaint which the patient made was of headache; this was quite definitely not hemicranial in type, as is somewhat frequently the case in such cases; on the contrary, the pain was all over the head, but in addition the left eye she stated to feel numb. I could not, however, satisfy myself that there was any real deficiency in the sensitiveness of the skin in the neighbourhood.

Considering the previous history I could not hold out to her much prospect of improvement till after her infant was born, and I thought it probable that even then the return to normal would be very slow and possibly incomplete. This has proved to be the case, for though I have kept her under observation from time to time up to now—a period of more than two years—and have given iodide, nerve tonics, &c., I have only a partial recovery to record. At the present time (not to multiply records very similar in their information) she still has slight divergence, upward movement is very feeble, downward movement in the middle line and to either side is good, and the pupil is active and accommodation normal for her age; there is practically no ptosis.

One curious point deserves mention, viz., that the pupil of the left (affected) eye is markedly *smaller* than the right eye, this inequality between the two being more marked in a dull light than in bright, as the left pupil scarcely dilates at all. This would suggest a paralysis of the dilating muscle of the pupil, but I failed to find any other indication of interference with the sympathetic.

It is hardly needful to do more than report the facts which this case illustrates without reviewing the literature of the subject. Cases of recurrent paralysis of the third nerve are met with at rare intervals, but

in this particular instance the more peculiar points present are the close association between the repeated onsets and recurring pregnancies, the coincidence of a type of headache quite distinct from the hemicrania which is certainly apt to accompany recurrent paralysis, the involvement of the external rectus, and the condition of the pupil. I am not of course in a position to prove absolutely that the condition in the two pregnancies preceding that in the course of which she consulted me was a paresis of the left third nerve, but I think there can be little reason to doubt it. In the fourth pregnancy double vision for the last fortnight, followed by rapid and complete recovery: in the fifth double vision for the last six weeks, with ptosis, followed by rapid recovery: in the sixth pregnancy double vision, ptosis, and definite paralysis of the pupil for ten weeks, followed by slow and probably permanently imperfect recovery—form a series which he who runs may read. I thought it right to tell the patient that, looking to the gradual “deepening” of the paralysis with recurring pregnancies, I could hold out little hope of improvement should she have another pregnancy, as it is much more than probable that the paralysis would return earlier and be even less amenable to treatment.

In some of the reported cases it has been doubtful whether the lesion has been basal or nuclear, but in this instance I do not doubt that it was basal in situation, though what the precise nature may be is more difficult to say; probably I should judge an inflammatory affection determined by certain of the toxins present in the system during pregnancy. Each recurring attack renders the part more susceptible to the same injurious influences again, and makes the recovery more protracted and more imperfect. In



a considerable number of reported cases there has been some relation, more or less definite, to errors of menstruation, and here we have an example occurring during physiological amenorrhœa. I think the same peculiarity must have struck many observers in connection with scleritis, along with which menstrual irregularities are often present, and which is also apt to occur during pregnancy and lactation.

In the OPTHALMIC REVIEW for 1900 (pp. 91, 198, and 318) will be found notes of three cases of this somewhat rare condition.

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## REVIEWS

P. RÖMER (Würzburg). Sympathetic Ophthalmia.

I. Sympathetic Ophthalmia as a Metastatic Phenomenon. *v. Graefe's Archiv für Ophthalmologie*, Bd. lv., Heft 2.

Interest in sympathetic ophthalmia has flagged somewhat of late years, chiefly on account of the fewer cases which are now seen, and partly, perhaps, because of the apparent hopelessness of arriving at the true etiology. It is likely to be aroused again by the incisive arguments and ingenious experiments which are brought forward in Römer's recent contributions to the subject.

The first paper is devoted to a critical review of the current theories. Regarding sympathetic ophthalmia as a disease due to infection, there are three factors of fundamental importance—the exciting agent, the conditions of development, and the paths of entry and propagation.

Two features are characteristic of the exciting agent: (1) Its ability to remain potent in the eye or in the organism for a prolonged period; (2) its innocuousness—whether from loss of virulence, or from adaptation—for other organs of the body. These peculiarities practically

exhaust this factor as a source of determining the pathogenesis of the disease.

"Disposition," or the conditions of development of a disease, is always the least known factor, yet upon it rest many of the theories of sympathetic ophthalmia. Such a foundation is most insecure when the causal agent is unknown. Upon it were built the theories of nervous influence, at first of the optic nerve, later of the ciliary nerves (H. Müller). At that time the limits between nerve stimulation and inflammation were ill-defined. After these had been completely dissociated the modified ciliary nerve hypothesis (Schmidt-Rimpler) arose. According to this, stimulation of the ciliary nerves in one eye causes reflex disturbance of the circulation and nutrition in the other, paving the way for disease. Römer's experiments, disproving this theory, are described in his second paper; the experiments in its favour, recorded by Mooren and Rumpf, Bach, Moll, &c., cannot withstand criticism.

Only two paths of propagation from one eye to the other are available: (1) The lymph-track, by the optic nerve; (2) the blood-track, by the circulation.

The first path is adopted in the migration theory, of which Deutschmann is the main exponent. Against it is the fact that, although there is not the least obstruction to organisms passing from the intervaginal space to the meninges, yet meningitis does not occur. It is inconceivable that staphylococci, which are considered to be of etiological moment in sympathetic ophthalmia by Deutschmann, should suddenly lose their virulence in the optic nerve and base of the brain, and as suddenly regain it on reaching the other eye. Moreover, staphylococci are essentially pyogenic, whilst sympathetic inflammation is plastic. In order to deduce any conclusions as to the pathogenesis of sympathetic ophthalmia in man from experiments with pyogenic organisms on animals it would be necessary to investigate the effects of attenuated cultures. This has not been carried out by the supporters of the migration theory, but Bach's results are subversive of it.

Further, in order to prove the migration theory, it would

be necessary to trace a continuous propagation of the germ from one eye to the other, and then to show that it was dangerous to the eye alone, and not to the organism as a whole. Bellarminoff and Selenkowsky, using *St. pyogenes*, *B. coli*, *B. prodigiosus* and *B. pyocyaneus*, failed in twenty experiments to find any change in the opposite eye, unless general infection occurred. It is noteworthy that in the five cases in which the sympathising eye has been examined the inflammation in the optic nerve diminished from the globe backwards. Cases are also related by Trousseau and others in which sympathetic inflammation occurred in spite of resection of the optic nerve of the injured eye. The migration theory fails entirely to explain the fact that the inflammation in the second eye often commences in the anterior part of the uveal tract. Römer admits only one remote possibility, viz., that the exciting agent may be carried along the optic nerves by phagocytes, without its virulence being annulled.

The most probable mode of transmission is by the blood. This view was expressed first by Mackenzie, but is usually attributed to Berlin. It was re-stated in England by Hutchinson, and is supported by Nettleship. The theory most readily explains clinical facts, and is in unison with bacteriological requirements. It is probable that Berlin's hypothesis, that the germ "can only be propagated in the second eye and not in any other part of the body" will require modification. We know now how differently the same organism reacts in different tissues.

The chronic uveitis which characterises sympathetic ophthalmia indicates that the exciting agent develops slowly. Bacteriology tends more and more to show that in almost all infections a portion of the excitant is absorbed by the blood; the theory of immunity, indeed, depends upon this fact. The development of immunity, the production of specific anti-bodies, especially of bacteriolytins, would be inconceivable if a certain proportion of bacteria did not reach the organs in which the corresponding haptophore groups were to be found. Even in pyæmic processes it may be weeks before the casual agent can

break through into the blood. The fact that in sympathetic ophthalmia it takes at least fourteen days after the injury before it begins in the second eye is therefore quite consistent with the blood-transmission theory. As long ago as 1886 Wyssokowitsch showed that spores of saprophytes could remain alive in the capillaries of the liver and spleen for seventy-eight days. No theory explains so well the fact that sympathetic inflammation can start without any prodromal inflammatory symptoms. This is comparable with metastatic development of tubercle in the eye. It also explains the absence of meningitis, and those cases of pure iridocyclitis which are such a stumbling-block in the way of the migration theory. Moreover, this theory alone explains the cases of sympathetic choroiditis described by Hirschberg, Haab and others.

J. HERBERT PARSONS.

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A. TERSON. Dermatological Classification of Ciliary Blepharitis. *Annales d'Oculistique*, July, 1903.

Terson discusses the forms of blepharitis in a somewhat lengthy article.

Passing over the consideration of certain parasitic forms such as favus, pityriasis, acne, and sty, and also eczema of the skin surface of the eyelid, he proceeds to the consideration of follicular blepharitis, and divides the cases into two groups, the suppurative and the non-suppurative. The former is the more common form and the more serious in its effects. The lid margins are usually seen covered with yellow crusts which involve the eyelashes. The epilated eyelash has a yellow bulb attached to it, and leaves a loss of substance in the lid margin with bleeding and suppurating surface. The organism always found in these cases is the micrococcus pyogenes aureus, and occasionally the albus is also present. The study of the eyelashes has shown the condition to be one, not of eczema, but of folliculitis involving the bases of the eyelashes.

Suppurative blepharitis may be acute or chronic; the chronic form is often of rodent character, causing a permanent destruction of eyelashes, and leaving hypertrophic and cicatricial patches along the lid margin resembling the condition of sycosis as described by dermatologists. Suppurative blepharitis may have been preceded by impetigo, in which case the streptococcus has been present, or eczema may have been the primary morbid process. In children, when, as is often the case, there is a combination of eczema and impetigo present, it is impossible to determine which may have been the first to develop. From whatever origin, however, the suppurative form should be classed as a folliculitis, and termed "ciliary folliculitis" as it forms a true sycosis in a certain number of cases.

The causes which predispose to follicular infection are local and general. Among other local causes are microbic infection from the nose, from the lachrymal sac, the conjunctiva, and from particles arrested by the eyelashes; the influence of weeping, which softens the epidermis, the minor traumatisms caused by scratching, and the infection directly introduced in this way. Under general causes, the individual diatheses, and especially scrofula, are mentioned. The question is here raised as to how far the diathesis may be a factor in causing changes in the secretions which continually bathe the emunctory orifices connected with the eyelashes. The growth of organisms might in this way be stimulated, and those more or less harmless forms, normally present in small numbers, might by their increased activity set up a morbid state of the parts and render the tissues more vulnerable to other infections.

The squamous varieties—which are non-suppurative—comprise a number of types. The scales may be very fine and floury, or the palpebral border may be covered with yellow crusts, which may be dry and friable, or moist and greasy. These yellow crusts are not formed of dried pus, but from the dried secretion of the sebaceous glands. When removed they leave a reddened skin surface, but not an ulcerative surface, as is the case when the crusts are removed in the suppurative form.

The demodex—according to Raehlmann, who has studied it—does not occur in connection with any of the classical forms of blepharitis; its clinical significance is quite uncertain. It may occur in blepharitis acarica, a variety in which there is a tenacious waxy secretion like yellow vaseline, which does not form crusts, with thickened and reddened lid margins.

The furfuraceous variety is probably identical with pityriasis simplex of the scalp. Bacteriological examination shows staphylococcus, and the "bottle bacillus" described by Malassez and afterwards by Unna. Microscopic examination is here of more use than cultures, because cultures only show the micrococcus albus which is common to many conditions and does not help the diagnosis of pityriasis.

Other forms include the dry and moist forms of seborrhœa in which the micro-bacillus described by Sabouraud should be looked for. Here again the microscope is more useful than cultivations, as the latter so often only show the micrococcus albus.

True eczema of the lid margins, to which Terson devotes a considerable portion of his paper, may also occur; it does not leave scars. He declares that in this article he has only wished to break ground and to show how much there is yet to be done. He regards the subject of blepharitis as more especially within the sphere of the dermatologist, and looks to him for the further advance of our knowledge of the matter.

A. H. H. SINCLAIR.

GIUSEPPE ALBERTOTTI (Modena). Depression of Cataract. *La Clinica Oculistica*, June, 1903.

There are two methods or classes of methods of performing this operation, differing according to whether the lens is caused to slide down so that its posterior surface becomes the upper—depression—or to turn over as on a hinge lying in an inferior position, so that its anterior surface becomes the upper—reclination.

A considerable number of the operators of former days, and, indeed, some of those of recent times who have found occasion to employ this operation, have made their point of entrance in the sclerotic rather than in the cornea; at this Albertotti confesses to some natural astonishment that operators should run the risk of injury to the choroid and ciliary body as well as risk of immediate hæmorrhage, but supposes the explanation to be that with a more posterior point of entrance the actual manipulations involved in reclination or depression are rendered considerably easier. In order to be able to perform the requisite manœuvres easily, and yet by means of a corneal puncture, which he looks upon as of necessity much preferable to a scleral point of entrance, Albertotti suggests the use of a new instrument, or rather of a modification of one of Snellen. His own is also a reclination loop, stouter than that of Snellen, about 6 mm.  $\times$  5 mm., having a gap in the circle of about  $2\frac{1}{2}$  mm. close to the stem on one side, like a ring in fact (but with this "hiatus"), somewhat flattened laterally and slightly curved on the flat, the curved face being indicated on the handle by two little marks easily recognised by the finger. In another type the instrument is the same, but the whole loop or broken ring is bent over at a right angle laterally to the stem. These he found to act well in the method of operating about to be described, the size of the loop being adapted to the dimensions of the cornea and anterior chamber.

The operator stands in front of the seated patient if he is operating on the left eye, and if he is not ambidextrous, he should move to the side of the patient when dealing with the right eye; it may sometimes be more convenient to have the patient lying on a couch, but if this is done his head should always be kept well up. The speculum is inserted and the eye fixed by forceps, which are applied at the superior extremity of the vertical meridian of the cornea. The pupil being dilated, the cornea is to be punctured at its lower part, 2 mm. within the margin, the needle being held parallel to the plane of the iris and thus caused to pass somewhat obliquely

through the layers of the cornea. Through the aperture thus made the hook is now introduced, a manœuvre requiring some dexterity, in such fashion that when the handle has made its circuit and the whole of the loop is in the anterior chamber, the instrument lies behind the iris at the upper portion of the anterior chamber, and presses directly on the lens in this region. Using the corneal wound as its fulcum, the operator now raises the handle of the instrument and thus depresses the lens, which is detached from the suspensory ligament above by the pressure; this action is assisted and regulated also by the action of the hand holding the fixation forceps. When the lens is now thoroughly depressed it should be held in that position by the hook for ninety seconds or more before this—with much care for fear of injuring the iris, &c.—is guided on its tortuous journey out of the corneal wound once more; in doing this it is very important to keep the plane of the loop always parallel to that of the posterior surface of the cornea. Should the lens rise from its new place the operation can readily be repeated. If the operator stands in front of his patient he will require the differently curved “reclinator” for the other eye.

A serious objection which occurs to one reading the account of this operation, otherwise a rather attractive method for the rare cases in which this operation may be done, is that an unruly patient could do so much injury to his eye before the operator could possibly succeed in extracting the loop through the narrow opening by means of the sweeping movement of the handle.

W. G. S.

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APETZ (Würzburg). Metastatic Ophthalmia in Gonorrhœa. *Wochenschrift für Therapie und Hygiene des Auges*, 43, 1903.

It sometimes happens that conjunctivitis occurs as a complication in gonorrhœa in a case in which contact of the eye with the pus can be with certainty excluded; in



such cases the cornea suffers very rarely indeed, while iritis, joint affections, &c., are more frequent. It is more particularly on account of the great rarity of such metastatic conjunctival and corneal affections that Apetz records the following case. It was that of a medical student who suffered from an obstinate gonorrhœa, which began in July, 1893, and only ceased under treatment in October. From that time onward he had no doubt as to the completeness of his cure; he had no symptoms whatever. But one morning at the beginning of November, 1899, that is, six years later, after over-indulgence in alcohol, but without, he asserted, any sexual irregularity, pus again appeared coming from the urethra, and on the same day the patient complained of a feeling as of sand in the eyes. In a couple of days there was definite conjunctivitis with slight muco-purulent secretion, as well as swelling and pain in the right knee and ankle; next day the left knee and hip and the jaw and spinal column were attacked, and next he had an inflammation of the sheaths of the tendons on the dorsum of the foot. His conjunctivitis was quite well again in a week, but it was not for more than six months (May, 1900) that he could fairly be said to be free of his joint affections.

Two months later the discharge suddenly began again without any apparent reason, and along with it a fresh attack of bilateral acute conjunctivitis, with more copious muco-purulent conjunctivitis than on the last occasion, and also invasion of the same joints in swift succession, and the patient became pale and looked badly fallen off. Under judicious treatment the conjunctivitis passed quickly away, but returned immediately and a rapidly advancing ulcer of the cornea formed. The conjunctiva, both of the lids and globe, was somewhat injected and slightly swollen; there was increased lachrymal secretion with flakes of muco-pus, and some photophobia, but on the whole no special indications of an acute infective process. The left cornea, iris, &c., were quite normal, and with —3.5 D. that eye enjoyed full vision; but in the right cornea there was a ring ulcer round two-thirds of the circumference, and

even in the gap the cornea was much infiltrated. Within the deeper ulcer there was a large superficial one with infiltrated edges, and elsewhere a greyish-yellow opacity through which one could barely see the iris; the anterior chamber was half occupied by an exudation of lens shape. The tension was slightly raised and the globe tender: vision was equal to finger-counting close to the eye. With one or two relapses, however, the condition responded fairly well to treatment, and vision eventually was secured of  $\frac{1}{10}$ . The left eye passed through a minor attack and was left with full vision.

Such a recurrence of gonorrhœa and the other attendant manifestations present in this case after six years of latency is a very singular history, and that there was no fresh infection seems to be quite certain. In particular from the ophthalmologist's point of view the occurrence and recurrence of conjunctivitis at so very late a date is of course very striking. Unfortunately there were no means at the time of making any thorough examination of the pus for gonococci, but in certain of these cases of metastatic gonorrhœal conjunctivitis the distinctive germ is not to be found in the secretion. That the conjunctivitis was in truth metastatic and not a direct infection seems proved by the mildness of the affection itself and its rapid healing up, and by the fact of its occurrence along with, and as part of, a generally "lighting up" of the disease, as shown by the increased urethral secretion, the joint affections, &c.; also by the bilateral character of the affection of the eyes, the iritis, cyclitis, vitreous haze, &c., which accompanied the various attacks. A suggestion has been made by Bornemann that in such cases the metastasis is due not to the gonococcus but to the accompanying staphylococci and streptococci, but there seems to be no basis for such a theory. Another theory is that the metastasis is due to the products of tissue change induced by the gonococcus—to the gonococcus toxins—and this has some semblance of truth, for Morax has succeeded in inducing conjunctivitis by dropping into the eye (in animals) a dead culture of the gonococcus. Whether the germs

themselves or their toxins were the cause of this inflammation remains uncertain.

The case thus briefly recorded is one of much interest and of considerable importance as regards the occurrence of gonorrhœal ophthalmia, even if the precise mode of production of such metastases is still a little uncertain. The very late onset of conjunctivitis at the same date as the joint affections, &c., is very unusual and very instructive.

W. G. S.

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**TRONCOSO (Mexico). The Composition of the Aqueous Humour in Cases of Senile Cataract.**  
*Annales d'Oculistique, August, 1903.*

The history of the development of our knowledge of the onset of cataract and of the various theories propounded to account for the occurrence of the disease would prove an interesting study. And even yet we are ignorant of the true cause which produces opacity of the lens, not only in cases of spontaneous senile cataract, but also in secondary cataracts and in those dependent upon certain disorders of nutrition. To say that it is due to albuminuria, to sclerosis of the arteries, &c., is quite plainly without warrant; to say that it arises from an enfeeblement of the anterior epithelial cells and a want of growth of the latest formed fibres is merely a cloak to cover ignorance. There is nothing new, says Troncoso, in the endeavour to assign as the cause of cataract the varied chemical action of the intraocular fluids; Kunde, among others, suggested this fifty years ago. He produced cataract in frogs and dogs by introducing a solution of chloride or nitrate of sodium into the large intestine, and even injecting it subcutaneously; in the case of the frogs the condition was the more striking from the fact that if the animal was then placed in water the newly formed cataract disappeared. Heubel has demonstrated that any substance with a strong affinity for water may, when introduced into the circulation, produce cataract; chloride of potassium and of calcium will do so

when placed in the conjunctival sac. The cataract-producing effect of naphthalene is of course well known now, and is believed by some to exist in virtue of the alteration which it produces in the quality of the ciliary secretion which nourishes the lens; others hold that the cataract is secondary to dystrophy of the vitreous, believing that it is from the vitreous that the nutrient stream for the lens comes.

The demonstration of an increased quantity of albumin in the aqueous in cases of cataract is an old story now; in diabetic patients both albumin and sugar have been found. The theory of cataract formation in diabetics was that, in consequence of the presence of sugar in the aqueous, dehydration of the lens by osmosis took place, and opacity followed as the result. The fact that the amount of sugar is very small does not invalidate this theory, for the action must necessarily be continued over a very long period of time. In the course of some investigations regarding the pathology of glaucoma, the author had occasion to examine many normal aqueous humours, and found that in patients with some cataract the proportion of the saline constituents is distinctly higher than the average normal. (The mere temporary presence of albumin obviously does not necessarily lead to cataract, else no patient with hypopyon-keratitis could escape from it.) He gives details of the proportion of mineral and of organic substances in three cases of early cataract, in five of mature, and in one of over-ripe cataract. Of those in an early stage, two were nuclear; and in them the mineral substances were very considerably in excess, while the organic were in the usual proportion. In one case of early cortical cataract the mineral substances remained normal, while the organic were slightly increased. In the series of ripe cataracts the proportions differed but little from the normal; and in the case of over-ripe cataract the organic substances were present in excess. It is plain then, from the results, few though they may be in number, that the condition of the aqueous humour in cases of "normal" cataract, containing as it does no increased

quantity of organic substances, is entirely different from what holds good in naphthalene cataract: in this latter condition there are grave alterations of retina, choroid, and perhaps ciliary region, and in consequence a relatively high co-efficient of albumin. In the case of over-ripe cataract alone was the proportion of albumin high; this Troncoso looks upon as an expression of the fact that absorption of the lens and its gradual diminution in bulk were actually in progress. He holds that albumin in the aqueous is an indication only of increased tension, and draws attention in this relation to the fact that spontaneous absorption of the lens is liable to lead to glaucoma.<sup>1</sup>

The facts as regards the saline constituents were, however, quite different. It seems to be the case that in the earlier stages of nuclear cataract the proportion of these is too high, but sinks to normal again when the cataract is ripe: in cortical cataract there does not appear ever to be any rise in the relative proportion. He thinks the high proportion of salines may be due to the removal of moisture, in the process of sclerosis, from the nuclear portions of the lens. There must obviously be a very considerable difference between the earlier stages of cataract when the lens as a whole takes in water, and the later, when the lens becomes more sclerosed, less bulky, and less watery. The main conclusions from the study of the aqueous humour, then, are that there is not an increase in albumin, and that we are not much wiser as to the real process of cataract formation than we were before.

W. G. S.

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E. HERTEL (Jena). On Myopia. *v. Graefe's Archiv für Ophthalmologie*, lvi., 2.

The author has undertaken a statistical analysis of the cases of myopia observed during the last ten years at Jena. This analysis was undertaken with the view of throwing, if possible, some light on the question whether myopia in all cases has to be considered as a disease (Donders) or

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<sup>1</sup> See OPTHALMIC REVIEW, xx., 209.

whether myopia from near work was a harmless condition, to be separated from progressive high myopia with its usual sequelæ of serious changes in the eyeball itself.

Out of a number of 27,671 patients seen during the last ten years, nearly half, viz., 12,331, were found suitable for the author's statistical purposes. They represented: hypermetropia, 41 per cent.; myopia, 31 per cent.; emmetropia, 28 per cent. With regard to the age, adults (over 14 years of age) showed a decrease of hypermetropia and an increase of myopia, as compared with children; but even in adults the number of hypermetropics exceeds that of the myopics.

As to short range work, children up to 14 years and women were not considered suitable for the author's statistical purposes. This does not appear to us to have been done quite justly. Of the 7,292 men a very great percentage showed increase of refraction accompanying short-range work.

Entering into the detailed statistics of myopia, the individual eyes were counted, not the patients; of 6,863 eyes, 4,906 belonged to men and 1,957 to women. The author illustrates his observations by graphic curves, and comes to the following conclusions:

The number of myopic eyes decreases with the increasing degree of myopia.

The degree of myopia increases with age and reaches its height between 20 and 30 years of age. In apparent contradiction to this an increase in the occurrence of myopia takes place after the age of 50. This is due to the lens myopia in cataract, the females giving a larger percentage than the males.

Though commencing cataract leads to myopia—up to 7 D.—myopia does not seem to produce cataract.

Up to 14 years of age girls are more inclined to develop myopia than boys. After 14 years short range work increases more for the males than for the females, and with it the incidence of myopia. For the lower degrees of myopia, up to 6 D., the influence of short-range work is very marked; the short-range workers give a much larger

percentage of myopia than the long-range workers, a difference which, however, disappears for the high degrees of myopia.

With regard to vision, a gradual decrease could be observed proportionate to the increase of the degree of myopia. Normal vision is more frequent in men than in women; the limit of its occurrence was found at 11 D.

Posterior conus was observed in 87 per cent. of 6,654 eyes, mostly temporal, less frequently annular, less frequently still downwards, upwards, and on the nasal side. No difference was found in short-range and long-range workers.

Choroidal changes were found in 6.6 per cent. The frequency of their occurrence increases with the degree of myopia, and is greater in women than in men. This preponderance was found not only in short-range workers, but also among the rustic population of the district, and shows a greater predisposition to choroidal in the female sex.

Opacities in the vitreous also occur more frequently in women, and appear to be due less to high degrees of myopia than to choroiditic changes.

Detachment of the retina was found in 69 cases, or nearly 1 per cent.; here also women were in the majority with nearly double the percentage found in men. The occurrence in both increases with the age of the patient, the same as in non-myopic eyes.

The percentage of detachment of the retina was much greater in eyes operated upon for myopia, viz., 3 per cent. There is a disposition to capsular cataract in these cases which requires needling, *i.e.*, operative lesion of the vitreous, in 68 per cent.; and the post-operative opacities of the vitreous are favourable for the development of retinal detachment. For this and other reasons the author expresses strongly the opinion that even in the most carefully selected cases it is always advisable to confine operative treatment of myopia to one eye only. Concerning the progressive tendency of myopia in one and the same patient, 299 individuals (with 584 eyes) were ana-

lysed. Generally speaking—not considering any optical correction—the progressive tendency decreases with the age, the highest percentage being found between 10 and 20 years of age, 66 per cent.; 38 per cent. between 20 and 30 years, and only 18 per cent. between 40 and 50 years.

The average increase of the degree of myopia is between 1 and 3 D.

The questions as to the etiology and the heredity of myopia are also approached, but no definite answer could be given to either of them.

K. G.

LADISLAS V. BLASKOVICS (Buda Pesth). The Open Treatment after Operations. *Ungarische Beiträge zur Augenheilkunde*, iii., 1903.

TORNATOLA (Messina). The Open Treatment after Operations. *Revue Générale d'Ophtalmologie*, iii., 1903.

Blaskovics has followed the recommendations originally made by Hjort in the post-operative treatment of 3,087 cases. In this paper he gives details of 1,238 cases treated up to October, 1899, and compares them with his earlier operation cases treated with bandages and dressings. The series includes 615 combined cataract extractions, 124 simple linear, and 38 combined linear operations.

His technique after an extraction is as follows: Both eyes are covered with boric lint held in place by strips of plaster, with a Fuchs' shield over the operated eye. The patient is kept recumbent for two or three hours, after which he is allowed to sit in an easy chair. The dressings are removed at the end of twenty-four hours, and only a Fuchs' shield is subsequently worn as a safeguard against accidental blows, &c. The room is not darkened. The lids are cleansed twice daily with warm boric lotion. Blaskovics advocates the use of a bandage only when there is a tendency to the formation of a staphyloma, or in cases of accidental wounds when the edges overlap and



a certain degree of pressure is required to keep them in place.

Comparing the cases treated on the above plan with his earlier cases, Blaskovics finds that the percentage of failures (from iritis, cyclitis, or suppuration), is unaltered; delayed closure, and partial or complete reopening of the wound occur no oftener than with a bandage. The average stay in hospital of cataract cases was ten to eleven days, and the patients required no increased attention from the nurses. The visual results were unchanged. His impression is that post-operative astigmatism was not increased; but unfortunately this point was not tested.

The main argument of this paper, which is notably free from over-statement, may be summed up thus: The reluctance of ophthalmic surgeons to adopt the "open" method is due to objections more theoretical than real; the post-operative history and results of cases treated by this method are in all respects equal to those obtained with bandages and dressings; while treatment in a moderately lighted room, without bandages, and without confinement to bed, enhances the bodily and mental well-being of the patient so remarkably that the method deserves more general adoption than it has hitherto received.

W. W. S.

Writing on the same subject, Tornatola remarks that the advocates of the "open" method of treatment put forward five claims on behalf of their system, viz.: that one thus obtains constant lavage of the wounded part by the tears as the lids move over the eye; avoids the elevation of temperature which takes place under a bandage; can bathe the eye frequently through the day; avoids the mental depression apt to be caused by exclusion of the light; and the discomfort of the lids the result of movement of the bandage. Up till now he has regarded these claims as not being very serious, but recently, in a few cases of cataract in which the patient during the twenty-four hours preceding the operation has manifested objection to the bandage, has adopted the plan of uniting

the eyelids by a suture! The loops of this suture are left long until after the completion of the operation, when they are drawn close and the lids thus brought into contact over the globe. The knots can be untied once a day or oftener for the applications of lotions, &c. In cases of exophthalmos the method is sometimes useful, as well as in ectropion, and possibly also in certain ulcers of the cornea; but as regards cases of extraction it is simply an example of perverted ingenuity, with nothing to recommend it.

W. G. S.

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P. GRADENIGO (Padua). The Extraction of Cataract in the Capsule through the Sclerotic after Zonulotomy. *Annales d'Oculistique*, July, 1903.

In view of the inconveniences, such as opacity and astigmatism of the cornea, synechiæ and disfiguration of the pupil, and secondary cataract, which are associated with the corneal operation, the author feels justified in recommending, in a slightly modified form, the old and discredited operation of extraction through the sclerotic. Even in pre-anæsthetic and pre-antiseptic days it was the operation preferred by a few surgeons, and Quadri appears to have been very successful with it. The ideal result in this operation gives a normal cornea, a clear pupil and a linear scar in the sclerotic, and the danger of complications in the present day is not great. The evident and primary danger in this operation is escape of vitreous, when the ocular coats are divided. This is minimised by making the incision in two stages: (a) puncture and counter-puncture are made a few millimetres apart with a fine Graefe knife, and the intermediate tissue is cut by gentle sawing movements; (b) this opening is enlarged by means of scissors or probe-pointed knife. The line of incision which gives least hæmorrhage and which best facilitates the extraction of the lens, is one parallel to the corneal margin and not far from it, corresponding to the base of the posterior chamber, *i.e.*, immediately behind the root of

the iris. After the incision is made the zonule is cut by means of the author's special zonulotome, and the lens is then expelled in its capsule by gentle and steady pressure. The author finds that by avoiding sudden movements and the introduction of instruments to extract the lens, the risk of loss of vitreous is obviated.

The author was led to adopt the scleral route by his observation of the slight reaction following sub-conjunctival dislocation of the lens. I doubt if many surgeons would be encouraged to do so by their experience of sub-conjunctival dislocations. Personally I have found the reaction marked, and in one case sympathetic ophthalmia ensued.

J. JAMESON EVANS.

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**AGOSTINO MAURIZI.** Consensual Reaction of the Two Eyes. *Bollettino dell' Ospedale Oftalmico*, May, 1903.

Certain investigations by Grünhagen, Jesner, Mooren, Rumpf and Buch, which show the similar or simultaneous reaction of the two eyes, seem to afford a new means of investigation in regard to the nature and origin of sympathetic ophthalmia. It may be true that experiments on similar lines by Wessely and Tornabene seem to cast doubt upon this idea, but negative results are not necessarily disproof; they may merely point to some undiscovered source of avoidable error, which can and must be eliminated before the chain of evidence is strong and irrefragable. The last-mentioned observer, working with an Abbé's refractometer, lays down two propositions: (1) that every irritation of an eye may increase the index of refraction of its aqueous humour, and (2) that the aqueous humour of the other eye shows no such alteration. This may mean of course that no such change takes place in the second eye, or that Abbé's refractometer is not sufficiently sensitive to show it. Jesner tapped the anterior chamber of the opposite eye and found that the fluid coagulated spontaneously in twenty-four hours, but

Maurizi has not been able to confirm this experiment ; in his hands coagulation never took place. However, it occurred to him to make a different experiment : he determined to weigh the fluid in a balance sufficiently accurate to show a difference of one deci-milligramme. First a fine platinum capsule was weighed, then the liquid was admitted to it and both were weighed, then the platinum capsule containing it was heated to  $100^{\circ}$  C. and cooled in a chamber in presence of chloride of calcium and again weighed ; the carbon was then oxidised by exposure to a gas flame, but not to heat sufficient to cause the evaporation of the alkaline salts, and the remaining substance weighed again. All these manœuvres were carried out with the proper precautions of a scientific physical laboratory. Thus the quantity of solids, of mineral, and of organic substances contained could be accurately determined.

His procedure then was (1) to remove the aqueous from the right eye ; (2) to apply an irritant to that eye ; (3) to aspirate the aqueous of the same eye in from one to six hours ; (4) to remove the aqueous of the other eye after the lapse of from one hour to seven days. We do not require to reproduce Maurizi's precise table of results ; it is sufficient to say that it shows clearly that in the stimulated eye the organic substances distinctly increase in quantity, especially the albuminoids, after irritation, and that this alteration in proportions holds good, though of course to a less degree, in the opposite eye.

As his means of irritation of the eye the author relied always upon the introduction of a metallic foreign body close to the corneo-scleral junction in such manner as to implicate the iris and ciliary body, and in order to avoid any fallacy from the irritation which would necessarily be produced by too frequent paracentesis of the anterior chamber, he was careful always to allow an interval of not less than three or four days between the tappings. For details of the method of operating, the form of cannula employed, &c., we must refer a reader to the original paper.

It is admitted that this reflex excitement, by way of the

ciliary nerves probably, can only give rise to what one might call the preliminary stage, the "scaffolding" for the true inflammation, which requires the presence of microbes. These microbes may be precisely those which have caused the original inflammation, in the opinion of many, which must have travelled from eye to eye by way of the optic nerves and chiasma. Maurizi argues that, given a lesion of the ciliary region of one eye, should that of the other react, the reaction will be of a type closely allied to that of the first eye, and on this soil thus prepared the organisms giving rise to the inflammation, reaching it by the general circulation, will exhibit their action as in a part peculiarly predisposed for precisely the same process as has taken place in the first eye. In a word, he attributes the identical character of the reaction in the two eyes, not to that fact of the similar nature of the pathological agent so much as to the uniformity of the irritative process.

W. G. S.

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TEILLAIS (Nantes). Ocular Paralysis and Hemiplegia due to Diphtheria. *Annales d'Oculistique*, July, 1903.

Ocular paralysis are, as is well known, a common complication of diphtheria, but only about 50 cases have been recorded in which hemiplegia supervened. Teillais adds two of the latter to the list.

The first of these was a boy, aged 9, who along with his sister got diphtheria at the beginning of June, 1901; he was treated with antitoxic serum and did well. At the beginning of July, however, vision became dim and speech and deglutition difficult. Right hemiplegia with ptosis—especially on the right side—followed a week later.

Teillais saw the patient at the beginning of August and then found the following complicated condition of affairs: In the right eye there were paralysis of the third nerve, slight ptosis, deviation outwards and downwards, and a pupil dilated and fixed from paralysis of sphincter pupillæ and of the ciliary muscles; in the left eye there was

paralysis of accommodation and of the superior rectus. The boy recovered in eight months from these symptoms, whose cause the author considers to have been a hæmorrhage since embolism was improbable, the heart being sound.

The second case was that of a boy, aged 7, in whom paralysis of accommodation developed in both eyes, followed a fortnight later by ophthalmoplegia on both sides, with paralysis of the left superior and inferior rectus. Slight ptosis was present and bilateral. The right pupil was dilated and fixed, the left normal. Then liquids began to be rejected through the nose, the patient became unconscious and acquired right hemiplegia; the case ended fatally. No serum had been used.

The symptoms of the sister of the boy mentioned first are also of interest in this connection. Her vision became dim, and this was followed by a short attack of paralysis of the soft palate and some difficulty in walking. When Teillais was consulted, she had paralysis of the left superior rectus, and paralysis of accommodation on both sides, but worse on the left. At the end of another month, however, she was quite well.

It will be noted that in all three instances paralysis of accommodation preceded that of the extrinsic muscles of the eye, and the ciliary muscle and iris were both affected at the same time, which is decidedly unusual.

Hemiplegia consequent upon diphtheria, as has already been pointed out, is very rare, and paraplegia is generally only incomplete. The latter involves all the muscles and is characterised by the absence of the patellar and Achilles reflexes, and the absence of any noticeable deformity; the former is a cerebral hemiplegia, with contractures, partial atrophy of the muscles involved, and arrest of development.

It has been regarded as an intercurrent affection, nevertheless it will be found to supervene always a few weeks after the commencement of the disease, generally not more than a month. In most cases it is preceded by paralysis of the soft palate and the ocular muscles. Its onset is therefore not a mere coincidence, but seems to bear a definite relation to the fever.

Mendel has summed up the various opinions as regards the pathology into three groups. In the first of these a neuritis is assumed to be the cause; the second assumes some lesion in the cerebrum or medulla to be the primary condition; and the third attributes the symptoms to circulatory disturbances, such as embolism, thrombosis and hæmorrhage.

Since the virus may act upon one or more of these parts, we may not assume one of these conditions alone to be the ætiological factor in every case; one or another or all might be present.

Hæmorrhages have been found in the cerebral and spinal dura, and in the sheaths of nerves, by Oertel; Roger discovered capillary hæmorrhages in the grey centres; Bühl capillary extravasations of blood in the brain. The paralytic phenomena may therefore be justly attributed to some cerebral lesion of this nature, in the absence of any cardiac lesion that might have caused embolism.

J. JAMESON EVANS.

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**A. BIETTI (Pavia).** The Diphtheria Bacillus in Simple Conjunctivitis. *Klinische Monatsblätter für Augenheilkunde. Beilageheft*, 1903.

Since the bacillus of diphtheria, or an organism very closely allied to it, is to be found almost constantly in the normal conjunctiva, it obviously must be present with great frequency in conjunctivitis, but since, according to several observers, these germs fail to cause any reaction when injected into animals, it seems clear that they must have lost their virulence. And indeed in cases of conjunctivitis clearly due to a definite organism such as the Morax-Axenfeld bacillus, these Loeffler's bacilli and their *alter ego*, the Xerosis bacillus, seem to disappear almost completely, only to flourish again when the virulence of the inflammation has passed off. On the other hand it must be frankly admitted that the organism is extremely apt at least to be associated with a particular form of membranous or pseudo-membranous conjunctivitis. An

important question arises, whether the two organisms, Loeffler's and the Xerosis bacillus, are not in truth one and the same; more virulent in one condition, more attenuated in another, and possibly also capable of altering from the one state into the other under certain conditions not yet known; that, however, is a question which scarcely affects the problem of which Bietti treats, and which he therefore refrains from discussing in this paper. The formation of a pseudo-membrane is in his view a matter of a certain form or degree of reaction, and cannot be shown to be related strictly to the presence of any one particular organism. It is quite clearly proved that other organisms than Loeffler's bacillus, which usually cause a simple catarrhal condition, are capable of setting up a membranous conjunctivitis, and if so why may not the diphtheria bacillus in its turn cause at one time a membranous, and at another a catarrhal conjunctivitis? Nor ought we to forget that the conjunctiva is not alone in this state of affairs, other membranes may be shown to have this feature. Thus, on the mucous membrane of the nose and throat are frequently to be found diphtheritic and pseudo-diphtheritic bacilli, and it has also been shown that the blood of persons who as a matter of fact have not suffered from "true" diphtheria may yet contain anti-diphtheritic toxins.

In a normal conjunctiva, diphtheria bacilli in a virulent state are very rarely to be found, as most authors are agreed, and probably also during attacks of inflammation due to other pathogenic organisms. Bietti, as the result of a long and elaborate series of investigations by means of culture experiments, injections into guinea pigs, and other means, fully confirms this contention. Further, he has convinced himself that this non-virulent Xerosis bacillus is never a cause of catarrhal conjunctivitis, as some have maintained.

W. G. S.



## SUBCONJUNCTIVAL INJECTIONS OF TUBERCULINE T. R. IN THE TREATMENT OF INTERSTITIAL KERATITIS.<sup>1</sup>

BY DR. A. DARIER, of Paris.

I WISH to relate in detail, with all its therapeutic particulars, the history of an interstitial keratitis of scleroising form which the following evidence leads me to believe to have been of a tuberculous nature : (1) The absence of all sign of hereditary or acquired syphilis ; (2) the violent reaction provoked by a subconjunctival injection of tuberculine T. R.

It concerns a girl, aged 13, small for her age, thin, rather pale, and of a slightly scrofulous appearance. Many fine downy hairs present on the trunk. No facial asymmetry ; good teeth.

Father and mother healthy. Of eight children only one is dead (at the age of 16 years, of tuberculous arthritis and other tuberculous affections).

In 1899 the patient had typhoid fever.

In 1900 repeated inflammations of the right eye ; at first transitory, then more persistent, at last accompanied by disturbances of vision, which became progressively worse despite treatment with yellow ointment, applied by another ophthalmic surgeon.

In 1901 the sight of this eye was completely destroyed.

In 1902 the sight of the left eye becoming affected in its turn, the patient was brought to Paris, and on July 18 I

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<sup>1</sup> Read in Section of Ophthalmology of the British Medical Association, 1903.

found that the left eye was affected with interstitial keratitis of the sclerosing form; from four different points of the limbus ran zones of corneal infiltration, each advancing to nearly the centre of the cornea. There was little redness and scarcely any photophobia.  $V. = \frac{1}{8}$ .

The right eye appeared to be completely lost. It was absolutely leucomatous and buphthalmic; it resembled a large marble of dull porcelain. With the binocular magnifying glass one could see that all the corneal tissue was infiltrated with granulous masses of a yellowish-white colour; it was impossible to see anything of the iris or the pupil; no appreciable redness except at the limbus.

What was to be done? There was no syphilis.

The classical treatment of interstitial keratitis: warm applications, atropine and mercurials are the only things which give manifest results—above all, when the hypodermic and intravenous injections are well borne by the patient and energetically practised by the physician.

Daily intravenous injections of cyanide of mercury were given, but they were not tolerated except in very feeble doses; intestinal troubles showed themselves when more than half a centigramme was exceeded.

Treatment was completed by instillations of atropine, warm applications and mercurial poultices<sup>2</sup> frequently repeated.

As to the right eye: ought one to consider it as lost? It was only too probable; but, being given the facts that there was still perception of light, that the malady was only of two years' duration, that the youth of the subject might have surprises in reserve which it was our duty to consider, I prescribed for this eye, in addition to the warm applications and general treatment, instillations of oily collyrium with essence of cloves, alternating with applications of dionine in powder and massage of the cornea with mercurial lanoline.

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<sup>2</sup> The mercurial poultice spoken of above is applied to the parts about the eye after the skin has been rubbed with equal parts of mercury and lanoline.

This treatment having no effect after a month, I replaced it by instillations of jequiritol, which caused very intense redness, extending to nearly the centre of the cornea.

In three months, after five series of applications of jequiritol (the last having had no action at all, tolerance having been produced), we saw this cornea clear notably. It took on a bluish, more transparent appearance; the patient saw the hand at a distance of several centimetres, and perceived colours very clearly.

One could hope, then, that this eye would not be quite lost; but by what means were we to bring about the vascularisation of the cornea, in order to improve sight, for we had already used all the most energetic measures.

I thought at first of applying the galvano-cautery to the margin of the cornea; but I preferred to try the effect of subconjunctival injections of tuberculine T. R.: (1) on account of the local reaction, which would replace that exhausted by the jequiritol; (2) on account of the diagnostic indication which it could give us; and (3) lastly, on account of its possible therapeutic power.

But we must first see what had happened to the left eye during these three months. The vision of this eye in July was  $\frac{1}{8}$ , the zones of corneal infiltration extended to the centre of the pupil, leaving a point of the cornea still transparent; one could, however, scarcely distinguish the texture of the iris and the form of the pupil.

The first intravenous injections (of cyanide) brought about, as usual, a slight aggravation, which, however, was not of long duration, as at first even very weak doses of 0.003 caused intestinal disturbance and stomatitis. Thus I was obliged to discontinue them and to replace them by mercurial periorbital frictions, while I prescribed cod-liver oil or cacodylate of soda.

As the sight of this eye rapidly diminished ( $V. = \frac{1}{50}$ ) I resumed the intravenous injections after three weeks, and I was surprised to find them admirably tolerated in the daily dose of 0.01.

There was then, after some days, an appreciable improvement; the vision returned to  $\frac{1}{25}$  and  $\frac{1}{15}$  (it was during this

period that the applications of jequiritol were made upon the other eye; revulsion that could not but contribute to amelioration).

After thirty intravenous injections the mercurial saturation was apparent in salivation and a marked feverish condition, with insomnia and anorexia. The injections were discontinued and replaced by iodide of potash and cod-liver oil. A new relapse: the cornea invaded in nearly its entirety, and on October 13,  $V. = \frac{1}{100}$ , the little patient could no longer walk alone. Not knowing what to call to my aid, not daring, as had been proposed, to introduce iodoform into the anterior chamber of this, the only eye, it occurred to me to use subconjunctival injections of hetol (or cinnamate of soda), the action of which upon general tuberculosis has been shown by Landerer and on ocular tubercle by Pflüger.

I used at first 15 subconjunctival injections of 0.002 to 0.007 of hetol. Was it this local treatment succeeding to the general treatment of which we have just spoken? Was it the simple evolution of the morbid process? What matters is this, that in three weeks, on October 29,  $V.$  was  $= \frac{1}{8}$ , and that the process of infiltration appeared to have begun to retrogress, the corneal edges clearing.

For myself, I had a very distinct and precise impression that the subconjunctival injections of hetol (eleven on the right eye and four on the left eye), without provoking any reaction, had a very great influence upon the evolution of the morbid process of the left eye. One could see in that another proof of the tuberculous nature of the lesions observed.

These same injections used four times under the conjunctiva of the right eye not appearing to have a great effect on this side, I decided to have recourse to tuberculine T.R.

Hypodermic injections of tuberculine have already been employed in ocular work, either as a diagnostic or as a mode of treatment in iritis and tuberculous keratitis.

In choosing for their application the subconjunctival way I had a triple object in view: (1) To prove the reaction pro-

duced from the diagnostic point of view; (2) to utilise the violence of it, even to cause an intense vascularisation of the cornea; (3) to study its therapeutic effects upon the tuberculous injection. But if this subconjunctival process presents great advantages, it has also serious drawbacks which cannot be ignored.

Briefly, after having tried for three days repeated instillations of tuberculine T.R.  $\frac{1}{1000}$ , I used on December 4 a subconjunctival injection of  $\frac{1}{20}$  of a milligramme above the cornea at the spot where the sclerotic presented its maximum of staphylomatous bulging (the cicatrical tissue which should follow the reaction should thicken and consolidate the bulging sclerotic).

The local reaction was most violent, but there was not the least rise of temperature and only a subjective febrile state, characterised by a little cephalalgia and agitation in the night.

For eight days the eye was very swollen, the indurated upper eyelid could no longer be everted, the bulbar conjunctiva was very chemotic, of a purple red, the cornea was invaded nearly to the centre by a pannous vascularisation which gave it a dirty red look.

The effect that I sought could not have been attained more precisely. I had, even towards the third day, a certain apprehension of seeing a phlegmon of the orbit appear.

On the sixteenth day, V. =  $\frac{1}{120}$  in place of  $\frac{1}{200}$ .

On the twenty-fourth day the vision had risen to  $\frac{1}{60}$ . January 5, 1903. Finally, at the end of a month, the sclerotic was still very hyperæmic and purplish; but the cornea was much less vascularised at its centre, with the bluish look given to it by the iris shining through the cornea. The sight had increased to  $\frac{1}{25}$ . Thus, after a single subconjunctival injection of  $\frac{1}{20}$  of a milligramme of tuberculine T.R., in *one month* the sight is raised from  $\frac{1}{200}$  to  $\frac{1}{25}$ .

Three fresh injections of tuberculine, used in doses of  $\frac{1}{100}$ ,  $\frac{1}{50}$ , and  $\frac{1}{30}$  of a milligramme, were given, and the sight was raised to  $\frac{1}{16}$  and then to  $\frac{1}{12}$ .

February 12. At this date the cornea was transparent enough to allow one to see with the binocular glass that there existed abundant exudations of a yellowish white colour upon the posterior face of Descemet's membrane. . . At intervals of a week I attempted to draw off the liquid from the anterior chamber; but this was so thick and viscous that the syringe could only draw off an inappreciable quantity. On the other hand, these attempts caused a considerable diminution of the vision:  $V. = \frac{1}{40}$ .

I then again used injections of tuberculine alternately upon each eye, because the left eye had also again softened, the corneal infiltrations having fused towards the centre, while the periphery cleared to the point of allowing fine fibrous adherences of the iris to be seen at the posterior face of the cornea. It was necessary that iridectomy should be done as early as possible. Iridectomy was accordingly performed on March 15.

June 20. After all these sustained therapeutical interventions, supported by numerous series of intravenous injections of mercury, of subconjunctival injections of hetol, of instillations of atropine, of dionine, &c., the vision had to a great degree returned: the right eye had  $V. = \frac{1}{15}$ ; the left eye,  $V. = \frac{1}{18}$ .

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## A SIMPLE METHOD OF FINDING THE INTERAXIAL DISTANCE FOR THE CENTRING OF SPECTACLE LENSES.

BY ANGUS M'GILLIVRAY, C.M., M.D., F.R.S.E.

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IN most of the text-books on ophthalmology and refraction one is struck by the frequency with which the interpupillary distance is given as a guide to the centring of spectacle lenses. What one should aim at in all cases of orthophoria is to see that the spec-

tacles are so adjusted that the visual axes traverse the optical centres of the lenses, and thus obviate prismatic effect. But the centre of the pupil seldom coincides with the part traversed by the visual axis, especially in cases with high angle alpha, as in hypermetropia, consequently the interpupillary distance cannot be regarded as a reliable guide.

If a patient be asked to look, with both eyes widely open, at a lighted candle, held say at reading distance, a brilliant tiny reflection will be seen on each cornea. This reflection, as shown by Priestley Smith and Maddox, corresponds for all practical purposes to the portion of the anterior surface of the cornea traversed by the visual axis. All one has to do then is to find an efficient and ready means of measuring the distance between these reflections, *i.e.*, the interaxial distance, at a point in front of each eye corresponding to the position of the spectacle lenses.

For the past few years we have used a form of sliding rule by which accurate measurements of the interaxial distance can be obtained in a few seconds. The instrument consists of a mechanic's pocket steel rule<sup>1</sup> (No. 412 D., Chesterman), round which is rolled a narrow strip of white paper with the running end gummed down, and so adjusted that it will slide along easily with the surgeon's finger.

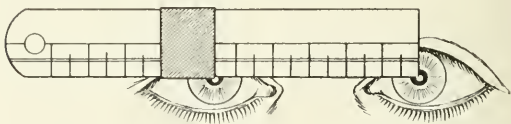
To take the centres for reading glasses ask the patient to hold a lighted candle straight out in front of him and to look steadily at the flame. The surgeon then places the edge of the rule, marked in millimetres, over the bridge of the nose so that the flat surface next the eyes may correspond to the posterior surface of the lenses. The square end (*vide* diag.) is next placed exactly in front of the left corneal reflection and held

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<sup>1</sup> Supplied by Curry and Paxton, London.

there, then the piece of paper is made to slide along till its edge is opposite the right corneal reflection. The rule is now removed from the patient's face, and the measurement read off. The surgeon should be careful to make his observations from a point as close behind the candle as possible and preferably with one eye closed.

Instead of the candle flame we have tried, in conjunction with the sliding rule, the reflection from an ophthalmoscopic mirror, as recommended by Priestley Smith for strabismometry, but have found it unsuitable for the obvious reason that the reflections from the corneæ could not be seen simultaneously.



In estimating the centres for distance glasses an electric lamp, placed above the level of the observer's head (6 metres away) is preferable to the candle flame, as the reflection from the latter is too small to be seen easily.

Another use the sliding rule can be put to is to ascertain that the spectacles, before being sent to the patient, have been centred according to prescription. To do this place the rule flat on the spectacle lenses and after adjusting it so that the square end may correspond to the vertical line passing through the optic centre of one lens, fix it in position with the finger and thumb of one hand. This vertical line can readily be found by looking through the lens at a vertical line, say the cord of a window blind, and moving the lens from side to side till the cord appears



unbroken. Once the square end of the scale is found to coincide with the vertical line passing through the optic axis of the lens, look at the cord again through the other lens and slide the paper along till the edge of the paper and the whole cord are in line. The scale can now be removed and the correct measurement read off. The method of estimating the centres of spectacle lenses by measuring the distance between corresponding points of each rim is far from reliable, seeing that it assumes that the optic centres of the lenses and the centres of the spectacle rims are identical. This is not the case in the writer's experience, for he has found that opticians are not always careful in attending to this important point.

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### REVIEWS.

**W. THORNER** (Berlin). *Theory of the Ophthalmoscope and Photography of the Fundus.* Berlin : Hirschwald, 1903.

The author's main object has been to photograph the fundus of the living eye. The work before us describes the various steps taken towards that end, and is full of interest apart from the question of photography.

Chapter I. contains a brief history of ophthalmoscopy and shows how narrowly the discovery of the ophthalmoscope was missed many times before Helmholtz achieved it. Soon after the original hand instruments came into use, attempts were made to diminish the technical difficulties involved, by constructing fixed instruments which should require less skill in handling, but although some success was gained, such ophthalmoscopes have never come into general use. The chief difficulty which the learner has to overcome is the avoidance of the reflections

from the object lens and cornea which, being more brilliant than the underlying picture of the fundus, conceal the latter unless they are got rid of. We learn to avoid them by slight inclinations and other adjustments of the mirror and object lens which are made almost unconsciously. In all forms of fixed ophthalmoscope they have hitherto proved a difficulty, especially if we desire to illuminate any considerable area of the fundus. For photographing the fundus, a fixed ophthalmoscope capable of giving a picture which is free from disturbing reflexes is the first essential.

Chapter II. deals with the causation and avoidance of these reflexes. *The immersion method*, that is the surrounding of the eye with fluid contained in a glass cell filled with normal salt solution or other fluid, has been used for the purpose. The fluid is in contact with the cornea, and the corneal reflex is thereby avoided, but the method is too troublesome to be satisfactory.

*Polarisation of the light* is another possible method. Polarisation simply by means of a glass plate at an angle of 55 degrees with the incident light, as in Helmholtz's instrument, is insufficient, for only that portion of the light which strikes the mirror precisely at one angle is completely polarised, and the corneal reflex is not got rid of. The use of two Nicol prisms in combination with convex lenses gives a better result. By such an arrangement, the author succeeded in getting reflex-free pictures of the fundus, but he abandoned it for the reason that too much light was lost, and because a better method was at his disposal.

*The geometric method*, as the author names it, does not alter the nature of the rays employed, but so disposes them in space that those which are reflected from the cornea as the light enters the eye take a different path from those which issue from the eye to reach the observer. The principle involved cannot be fully explained without diagrams. In the original work there are many, and they are of an intricate kind. An idea of the method, however, may be given here. In the first place, it is necessary to

remember that the source of light in ophthalmoscopy is always an area of some size, and not a point. Each single point in the light-source sends light to various parts of the fundus, and conversely each point in the illuminated area of the fundus, excepting its extreme limits, receives light from various points in the light-source. If we wish to ascertain which points in the light-source take part in illuminating a given point in the fundus, we can make a diagram showing the paths taken by rays issuing from a series of points in the light-source and thus ascertain which of them reach the fundus at the point in question; or, more simply, we can start from the point in question, draw the paths of the rays which issue from it, and thus ascertain which points in the light-source they would reach by travelling in the opposite direction. This differentiation of the different parts of the light-source and the corresponding distribution of the rays over the illuminated area of the fundus is the key to the problem in question.

The fundamental idea is to use one half of the pupil only for the illumination of the fundus and the other half for the inspection of it, or in the author's words, to divide it into an illumination-half and an observation-half. If we can confine the entering rays strictly to one half of the pupil and cornea, the rays which issue through the other half will reach the observer undisturbed by any reflex. Imagine a plane mirror placed very near to the eye, its vertical straight edge opposite to the vertical meridian of the cornea, and its surface at 45 degrees with the visual axis. It will cover, so to speak, one half of the eye, and rays of light striking it from the side, at right angles with the visual axis, will be thrown into the eye through one half of the pupil only, and of the rays which return from the fundus, those which pass out through the other half of the pupil will be obscured by no corneal reflex. But how much of the fundus can be illuminated in this way? In the emmetropic eye only a single point, and in any case only a very small area. If we are to illuminate a larger area of the fundus, we must employ rays which strike the

mirror not as a parallel pencil, but in various directions, and we shall then find that the illuminating rays enter through more than half of the cornea and pupil and that the observation rays in like manner reach the observer from more than half the pupil and cornea. If we take three points in the fundus, viz., a central point at the macula lutea, and one on each side of it, and construct a diagram showing the paths by which rays issuing from these points pass through the pupil and strike upon or pass by the mirror, we shall find that it is precisely those rays which, in entering or leaving the eye, trespass beyond their own half of the pupil that cause the reflexes or are obstructed by them, and thus hinder the observer's view of the fundus. Tracing these obnoxious rays onwards we can ascertain from what parts of the light-source they spring and where they are situated in the pencil which reaches the observer's eye. This is what Thorner has done, and he shows that they can be intercepted by means of two screens, one cutting off half of the pencil which leaves the light-source, the other cutting off half of the pencil which reaches the observer's eye.

Chapter III., describes Thorner's fixed reflex-free ophthalmoscope. This consists essentially of two tubes converging at an angle of  $45^{\circ}$ , the one for illumination, the other for observation. The point at which their axes meet is 1 cm. distant from the patient's cornea, and here, instead of the plane mirror imagined in the foregoing paragraph, is a total reflecting prism so placed that its vertical edge is opposite to the vertical meridian of the cornea.

To the outer end of the illuminating tube is rigidly fixed a lamp, paraffin or electric, the light from which enters the tube through an aperture equal in size and shape to one lateral half of the dilated pupil. The aperture is covered with ground glass. Having been transmitted through a system of convex lenses in the tube and deflected by the prism, the light reaches the pupil as a beam which has the form and size of the half pupil; in other words, a picture of the semi-lunar light-source is thrown upon the half pupil.

At the pupil, therefore, the light is confined strictly to its own side of the eye, but when it reaches the fundus it has spread so as to illuminate a considerable area. From the fundus the returning light issues, of course, through the whole of the pupil. Part of it strikes the prism and returns to the light-source; part of it issues unobstructed through the observation half of the pupil; while a third smaller portion passes out through the illumination half and crosses over accompanied by rays reflected from the cornea, to join the beam which passes to the observer's eye. In the observation tube is a system of lenses like that in the illumination tube and at the observer's end is a screen like that at the light-source which cuts off the obnoxious rays.

The details of the instrument need not be further described. It has a sliding ocular adjustment with interchangeable lenses, by means of which it can be adapted for hypermetropia and myopia in the patient up to very high degrees. It has a laterally placed finder like that of a telescope, by which adjustment can be effected either by the observer himself or by another person demonstrating the fundus to the observer. A second lamp placed behind the patient, and viewed by him in a mirror with the eye which is not under observation, serves to give the necessary direction to his eye.

Chapter IV. deals with the objective estimation of refraction. By means of the ocular draw tube and a scale fixed outside it, the observer, having accurately adjusted the instrument for the details of the fundus, can read off on the scale the refraction of the point in question. With a steady patient, we are told, the error does not exceed 0.25 D.

Chapter V. discusses the application of stereoscopy to the ophthalmoscope. As in previous instruments, the plan here adopted is to divide the rays which issue from the pupil into two parts; to deflect them laterally to the right and left by prisms; and when they have travelled a sufficient distance, to deflect them again by prisms into the eyes of the observer. In Thorner's ophthalmoscope, those

rays only which issue from half the pupil are available, so that the light passing to each eye of the observer comes from one quarter of the patient's pupil. The two main tubes are so arranged as primarily to divide the patient's pupil into upper and lower instead of into lateral halves. By this means a stereoscopic base-line equal to the full diameter of the pupil is obtained. The partition and deflection of the observation rays to right and left are effected, in one form of the instrument, close to the patient's pupil, in another at the ocular end of the observation-tube. The stereoscopic pictures obtained are described as very satisfactory; retinal vessels are seen to lie not on the choroid, but floating as it were in front of it, being separated from it by the transparent retina.

In Chapter VI. Thorner reviews the history of fundus-photography, from the first efforts of Noyes and Sinclair in 1862, up to his own work of the present year. Failure has hitherto been due chiefly to the smallness of the field obtainable, to the reflexes, and to the unsteadiness of the eye, and although the results have had some scientific interest, they have not been able to compete, for practical purposes, with hand made drawings. The new instrument appears to surmount much of the difficulty. The photographs reproduced come nearer to success than any others which we have seen. They are fourteen in number. The first two are of the fundus of a cat, the papilla occupying the centre of the field in one, the macula in the other. The retinal vessels, even to the fine branches nearly approaching the macula, are seen against the brilliant *tapetum lucidum*. The arteries are distinguishable from the veins by their much smaller size. The size of any vessel can be obtained by measuring it microscopically in the photograph and comparing it with the diameter of the papilla. The remaining photographs are all of the human fundus. They are of smaller size and show, on the whole, less detail than those from the cat, but they present good pictures of the papilla and its vessels and in several instances of the macula lutea. Though without colour and without the definition to which we are accustomed in hand

made drawings, they have, as far as they go, a truthfulness which can be obtained in no other way.

The light employed was obtained by the explosion, by electricity or percussion, of a powder consisting of 12 parts by weight of permanganate of potash and 8 parts of magnesium. The amount used each time was 2 grammes. The duration of the light so obtained is so short that it is over before reflex movement of the eye can occur. Plates of special sensibility were used. Those who desire to attempt this subtle and difficult kind of photography will do well to consult Thorner's original work on these and many other points of detail.

P. S.

SEGGEI (Münich). The Progress of Myopia.  
*v. Graefe's Archiv für Ophthalmologie*, lvi., 3.

Seggei gives an analytical account of 2,070 myopic patients (1,229 males and 841 females), observed by him in boys' and girls' schools during twenty-two years. Full correction was only carried out during the last six years in 451 cases, principally boys.

In the cases of full correction the average annual increase of myopia was 0.6 D, in non-corrected or under-corrected 0.85 D. In 43.4 per cent. of full correction the myopia remained stationary, in non-correction or under-correction only in 22.3 per cent. This benign influence of full correction, however, was only observed in boys. They showed with full correction an average yearly increase of 0.58 D., with under- or non-correction 0.9 D., whereas in girls the average rates of increase for full correction and under-correction were almost alike, viz., 0.76 D. and 0.77 D. respectively. Similarly the percentage of stationary myopia in full correction was 45.5 per cent. in boys against 30.6 per cent. in girls.

The progress of myopia is practically the same for full or under-correction up to the 16th year. It decreases for full correction from the 17th year, for under-correction only from the 21st year. Very striking is the beneficial in-

fluence of full correction between 10 and 14 years of age, where myopia remains stationary twice as often as in under-correction.

The author recommends, therefore, that one should correct the myopia fully and as early as possible from as low a degree as  $-1.25$  D., with the following restriction, viz., unless the patient is unable to read small print at 25 cm. with the correcting glass. He considers that myopia is caused by external muscular pressure where the sclerotico-choroideal canal is of abnormal width, or the posterior scleral portion of weak resistance, and that the decreased visual acuteness is produced by the traction of the posterior part of the inner membranes. This pulling action occurs especially when the circular portion of the ciliary muscle is under-developed or not developed at all. Where this circular portion is congenitally well developed, no such pulling takes place even under the strongest accommodative effort, and not only full correction but even over-correction is borne without any detrimental effect. As a practical rule Seggel never gives a glass that causes discomfort, and interprets the discomfort caused by a concave glass as the expression of insufficiency of accommodative power owing to an under-development of the circular muscle.

With regard to hereditary disposition there is scarcely any difference observable in the effect of full correction in acquired and hereditary myopia. In both cases the author, therefore, corrects fully in patients up to 20 years of age with sufficient accommodation, and V. of more than  $\frac{1}{2}$  from  $1.25$  D. to 6 D.; and from 6 D. to 10 D., if the glasses do not appear to reduce the size of objects too much, and do not restrict the peripheral parts of the visual field unpleasantly. In myopia beyond 10 D. a fully correcting glass is only given for special purposes, such as shooting, &c.

The influence of full correction on the arrest of the progressive tendency of myopia varies with the degree of the short-sightedness and the age of the patient. Higher degrees have a tendency to progress under 16 years; beyond 16 years of age arrest is more frequent.



The author summarises his experience in these words:—

(1) The result of ophthalmo-hygienic measures is irrefutable. Especially favourable is the effect of school hygiene in preserving good eye-sight and reducing the development of myopia, to a smaller degree in arresting the progress of the degree of myopia. The advancement of middle degrees to high pernicious myopia is often arrested, except in cases with congenital or hereditary disadvantages.

(2) In boys as well as in girls over-exertion of the eyes is especially to be avoided at 15 years of age, this being the time when acquired myopia with partial loss of vision most frequently develops; in girls often as early as 14 years of age.

(3) For girls who have to do sewing besides the ordinary school work, the latter ought to be still more reduced than for boys.

(4) Full correction in myopia under 1.25 D. is always to be effected up to 20 years of age when accommodation is perfect, the visual acuteness not much less than  $\frac{2}{3}$ , and the myopia less than 10 D. If accommodation is imperfect or difficult full correction is harmful. Difficulty of accommodation has to be distinguished from insufficiency of the internal recti; for the latter condition full correction and prisms or operative treatment will have to be applied.

K. G.

P. RÖMER. Sympathetic Ophthalmia. II. Experimental Researches on the Question of Transference of Irritation and the Conditions of Development of Sympathetic Ophthalmia. *v. Graefe's Archiv für Ophthalmologie*, Bd. lvi., Heft 3.

This paper is devoted to disproving experimentally the modified ciliary nerve theory, which states that owing to the inflammation of the injured eye, disturbances of the circulation and nutrition of the other eye are caused reflexly through the ciliary nerves, so that a *locus minoris resistentiae* is here brought about, preparing a suitable soil for the germs or their products.

Attempts have been made to test the theory by exciting inflammation in one eye by croton oil, &c., and then injecting pathogenic cultures intravenously (Panas, Moll, Stock). Wessely estimated the amount of proteid in the aqueous of each eye after one had been irritated. He found no increase in the second eye, and his results have been confirmed by Tornabene.

Römer has applied a much more delicate test. If 15 to 20 cc. of fresh defibrinated ox blood are injected once into the peritoneal cavity of a rabbit, after the ninth or tenth day its blood shows certain peculiarities. Rabbit's normal blood serum is unable to dissolve ox blood corpuscles; after this treatment a minimal quantity (0.008 cc.) will dissolve a large amount (0.2 cc.). These specific hæmolysins are of a complex nature. From the experiments of Ehrlich and others, they have been found to consist of a thermostabile amboceptor, resisting a temperature of 55—60° C., and of a thermolabile complement. The amboceptor by means of its cytophile group is chemically united with the protoplasm of the red corpuscles, and by means of its complementophile group fixes the complement of the serum, and so transfers this ferment substance from the serum to the blood cell. Neither amboceptor nor complement can destroy the red corpuscles alone. When it occurs it is seen by the solution of the hæmoglobin. The thermolabile complement is always present in normal serum; the amboceptor is formed by the organism after immunisation. Thus 0.2 cc. of ox blood is not dissolved either by (1) 0.005 cc. of inactive immunised serum, *i.e.*, immunised serum which has been heated, so as to remove the thermolabile complement, the amboceptor alone remaining, or by (2) 0.01 cc. of active normal serum, *i.e.*, normal serum which contains the complement, but does not contain the amboceptor. It is, however, completely dissolved by a mixture of the two.

Römer has found that no hæmolysins are present in the aqueous of the immunised animals. If, however, the aqueous is drawn off again after an interval of three-quarters of an hour it is powerfully hæmolytic. The delicacy of the test is shown in the fact that a fraction

of a milligramme of the second aqueous will dissolve fifty or sixty million red corpuscles. Now, intense irritation of one eye does not cause the slightest trace of hæmolysin to appear in the normal aqueous of the other, whilst in every iritis and iridocyclitis hæmolysins are at once found in the aqueous of the first eye.

It was possible that the complement might already be present in the normal aqueous, whilst perhaps only the immunising bodies, which in serum are chiefly attached to the globulins, entered with the regenerated aqueous. An exactly titrated hæmolytic serum was heated to  $60^{\circ}$ ; hæmolysis only occurred if 0.01 active normal serum (complement) was added to 0.0008 cc. of this (amboceptor). It was found that even 0.2 cc. of first drawn aqueous added to 0.0008 cc. of the inactive immunised serum failed to cause hæmolysis. The complement was therefore not already present: it only appeared when the aqueous was regenerated. It was similarly proved absent from the first aqueous of the immunised animal. In an analogous manner it was also proved that the amboceptor was not already present in the first aqueous of the immunised animal. After puncture the complement appeared in the aqueous of the normal animal, and also the amboceptor in the immunised animal.

Römer further showed that the complement was present in the aqueous one hour after subconjunctival injection of 4 per cent. salt solution.

One eye was irritated by various means, a chip of copper in the anterior chamber, injection of dead typhus bacilli or staphylococci into the vitreous. In every case the first aqueous was hæmolytic in the injured eye, but not in the other. The same result followed chronic intra-ocular inflammation, caused by the injection of a non-pathogenic culture of *bacillus subtilis*. Further, although the second aqueous of the uninjured eye naturally contained hæmolysins, these disappeared in twenty-four hours.

The experiments were also confirmed on monkeys, which were immunised with ox blood.

J. HERBERT PARSONS.

G. WYGODSKI (St. Petersburg). The Permanent Results of Iridectomy in Primary Glaucoma. *Klinische Monatsblätter für Augenheilkunde*, September, 1903.

This is a contribution, chiefly statistical, to the vexed question of the amount of permanent benefit likely to follow iridectomy in the various forms of primary glaucoma. Before quoting his statistics Wygodski defines clearly how his glaucoma cases are classified, as the differences in the grouping of the cases by various writers have greatly increased the difficulty of arriving at a fair estimate of the successes and failures attending the operation. He classifies cases of glaucoma thus—

- (1) Inflammatory glaucoma.
  - (a) Acute.
  - (b) Chronic.
- (2) Simple glaucoma.
  - (a) Typical simple glaucoma.
  - (b) Simple, but with intermittent inflammatory symptoms.

Under typical simple glaucoma he ranks those cases in which no irritative or inflammatory symptoms ever appear, in which the external appearances are normal, and the tension either normal or at most very slightly raised. The results of operative treatment he divides thus: (1) improvement; (2) status idem; (3) deterioration; (4) amaurosis. (1) and (2) he groups together as favourable results, (3) and (4) as unfavourable. The minimum observation period given is two years. He tabulates 37 operations for acute glaucoma, 147 for chronic glaucoma, and 129 for simple glaucoma. In acute glaucoma the results were:—

|                           |                              |
|---------------------------|------------------------------|
| Improvement, 76 per cent. | } favourable, 81 per cent.   |
| Status idem, 5 „          |                              |
| Deterioration, 11 „       | } unfavourable, 19 per cent. |
| Amaurosis, 1 „            |                              |

In no case could the ultimate deterioration of vision be ascribed to the operation.

In the cases of chronic glaucoma the results were not so favourable, but of 147 he quotes:—

|                           |                              |
|---------------------------|------------------------------|
| Improvement, 10 per cent. | } favourable, 50 per cent.   |
| Status idem, 40 „         |                              |
| Deterioration, 30 „       | } unfavourable, 50 per cent. |
| Amaurosis, 20 „           |                              |

In no case was an eye lost as the result of the operation, but in 7 cases immediate deterioration of vision resulted.

Of 34 cases from the above group operated on in the prodromal stage, he cites 85 per cent. of favourable results.

In simple glaucoma the operative results quoted are less encouraging.

In 104 typical cases:—

|                             |                                |
|-----------------------------|--------------------------------|
| Improvement, 0.96 per cent. | } favourable, 11.5 per cent.   |
| Status idem, 10.5 „         |                                |
| Deterioration, 52 „         | } unfavourable, 88.5 per cent. |
| Amaurosis, 36.5 „           |                                |

In 25 cases of glaucoma simplex with intermittent inflammatory symptoms:—

|                          |                              |
|--------------------------|------------------------------|
| Improvement, 0 per cent. | } favourable, 32 per cent.   |
| Status idem, 32 „        |                              |
| Deterioration, 36 „      | } unfavourable, 68 per cent. |
| Amaurosis, 32 „          |                              |

As before, in no case was an eye lost from the operation, but in 14 per cent. of the cases there was immediate diminution in vision after the operation. In half the cases the disease was far advanced before operation. As the period of observation extended over two years, some of the cases in which the progress of the disease was retarded, but not arrested, have to be classified as unfavourable, and even cases in which the disease appeared arrested, but in which vision had deteriorated since the operation, fall into the same category. This makes the statistics appear more unfavourable than they are when the question of benefit from the operation is considered.

The statistical results of previous writers are briefly commented upon. Most of these state that the results of

iridectomy for glaucoma simplex are much better than has been commonly thought to be the case, but Wygodski takes an opposite view, and points out that these opinions are for the most part based on cases which had not been long enough under observation to enable the observer to class the result as permanent. Other writers, again, classify relatively favourable results, *e.g.*, slower advancement of the disease, as favourable. Vettiger's work, in which a time limit of three years is set, gives only 25 per cent. of favourable results.

A confusion between chronic inflammatory glaucoma and glaucoma simplex seems also responsible for much difference of opinion as to the value of iridectomy in the latter condition. In cases of glaucoma simplex, according to Wygodski it is impossible to imagine an actual rise in visual acuteness, after the operation the maximal good effect being the retaining of the *status quo*. Cases quoted in other statistics with marked visual improvement after iridectomy could hardly, he thinks, have really been cases of glaucoma simplex.

To illustrate the difference between immediate and permanent results Wygodski gives a table of immediate results in his own cases, 458 in number :—

|                                   |      |                       |
|-----------------------------------|------|-----------------------|
| Acute inflammatory, 100 per cent. |      | } Favourable results. |
| Chronic,                          | 94 „ |                       |
| Simple glaucoma,                  | 90 „ |                       |

Myotics he found of little value in simple glaucoma, and uncertain in the other forms. His conclusions are: In inflammatory glaucoma iridectomy is indicated at all stages of the disease, but the prognosis is better the earlier the operation is done. The results of iridectomy in simple glaucoma are much less favourable, the arrest of the disease being accomplished in only a small percentage of cases. Still the iridectomy appears in a larger number of cases to slow the process, and appears to be the most effective treatment at our command. Cases in which the defect in the field comes close up to the fixation-point are not considered suitable for operation.

Especially in the inflammatory forms Wygodski strongly recommends a second operation in cases where increased tension returns.

J. V. PATERSON.

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PÉCHIN AND ROLLIN. Ophthalmoplegia and Arteriosclerosis. *Archives d'Ophthalmologie*, September, 1903.

The labours of Uhthoff and others have clearly proved that a lesion at the base of the skull can, by implicating certain nerve fibres while leaving others intact, simulate a lesion of the nuclei of origin of the nerves, and unless there are some unequivocal localising indications, the unusual selection of muscles may quite mislead one in diagnosis. They relate a case which comes under this category.

A man aged 64, the subject of syphilis, presented himself suffering also from arteriosclerosis, aortitis, hypertrophied heart, chronic nephritis, and tabes. On the left side he had ophthalmoplegia exterior, complete and total, with considerable failure of vision from optic atrophy. On the right side he had partial ptosis and paralysis of the superior rectus. He died soon afterwards, and at the autopsy there was found to be a generalised arteriosclerosis, particularly in the aorta and cerebral arteries. More especially the left carotid, in its course along the cavernous sinus, was much distended, and formed a bend with the convexity outwards, compressing the sixth and the other nerves, which pass by the outer wall; on the same side the ophthalmic artery was greatly dilated, its walls thickened and hard, compressing the optic nerve, which was indeed much flattened out.

When the patient first appeared, since he was the subject of tabes, it was very naturally supposed at first that the paralysis was due to the same cause; indeed the existence of the vascular lesions of the cavernous sinus was not diagnosed or even suspected during life; it was

a *post mortem* discovery. This discovery of course gave quite a different complexion to the case, and to the injury done to nerves by the great distension of the vessels in the narrow bony canals the paralysis must be attributed. Not improbably the third nerves were injured by the pressure further back, for the dilatation of vessels was very considerable in the interpeduncular space, and it may well have been that the damage was done first in that situation. Syphilis was probably in this instance the cause, not only of the tabes, but more directly of the paralysis as well.

The case illustrates very forcibly the ease with which an error of diagnosis may be made in a case which seems perfectly simple; in this case the error was the more serious that the fatal issue which occurred was not looked for at all; indeed the patient was dismissed from hospital just a fortnight before his death.

W. G. S.

B. PUSEY (Chicago). Cytotoxins and Sympathetic Ophthalmia. *Knapp's Archives of Ophthalmology*, July, 1903.

Having first of all described "Pfeiffer's Reaction," Pusey proceeds to give notes and examples of the further work conducted by other investigators of this subject.

When blood-cells from the rabbit are introduced into the horse, the blood serum of the horse develops poisonous properties towards rabbits. The injection into the peritoneal cavity of a guinea-pig of the macerated testicle of the dog, causes the blood serum of the guinea-pig to acquire the power of immobilising spermatozoa from the dog.

Toxins produced as in the above instances between animals of different species are termed *Heterotoxins*, and by various experiments a number of such heterotoxins of different kinds have been produced. Toxins produced in similar species or *Isotoxins*, were next studied. One experimenter ligatured the ureter in a number of rabbits, and some weeks later used blood serum from these animals



to inject into the ear veins of healthy rabbits; these then developed albuminuria, and in one instance degenerative changes in the kidney were found *post mortem*.

The injection into a guinea-pig of liver cells from another guinea-pig, has produced morbid changes in the liver of the animal thus treated. It has been found that while ligature of the pedicle of one kidney has been followed by more or less well-marked degenerative changes in the other kidney, no such changes have followed unilateral nephrectomy.

Pusey after a short recapitulation of the experimental work which has been done, expresses the view that the toxins in the blood take origin from the injured gland-tissue, and have a special tendency to set up morbid changes in gland-tissue of the same kind elsewhere in the body. If, he says, these conclusions (that is, his view of the matter) are accepted as correct, a hypothesis for the explanation of sympathetic ophthalmia at once suggests itself, namely that the cells of the injured eye, probably those of the ciliary body and iris, give rise to a cytotoxin which, having a selective affinity for the corresponding cells in the other eye, sets up inflammation there.

A. H. H. SINCLAIR.

## OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

OCTOBER 29, 1903.

The President, Mr. JOHN TWEEDY, in the Chair.

### THE PRESIDENTIAL ADDRESS.

*The Relation of Ophthalmology to General Medicine and Surgery and to Public Health.*—The President began his address by thanking the Society for the honour conferred upon him; he then eulogised the previous Presidents, pointing out that amongst their numbers were not only men who were eminent ophthalmic surgeons, but general surgeons, general physicians, neurologists and physiologists, to all of whom the eye must have been a most interesting object of study, and one of the most important avenues of knowledge. He also reminded the younger members of the Society that it had been in existence twenty-three years, that

during these years many of its original members had passed away ; the most recent gap had been caused by the death of Mr. George Lawson, who had been his teacher, colleague and friend, and of whom it might well and truly be said—"He was an upright man and one who feared God"; that other times bring other men, but still the duty devolved upon them of preserving and perpetuating the honourable traditions of the Society unsullied and unimpaired. He also hoped that the scope of the Society's operations would never become narrowed ; specialism was inevitable, but it behoved every enlightened member of the medical profession to take care that our specialisation shall be the legitimate and reasoned outcome of the growth of knowledge, the separation as it were of a subject in order to develop it to the utmost, and that ophthalmology more than any other specialty should be rational and rest upon a firm foundation of wide and thorough general and professional knowledge. He feared at the same time that there was a tendency for those who become attracted by ophthalmology to specialise too soon and too much, and urged that every effort to split up practical ophthalmology into two parts—the optical and the medico-surgical—should be resisted to the utmost, and that we owe it to ourselves, to the Society and to the public, to proclaim that ophthalmology is one and indivisible—an integral and essential part of the art and science of medicine.

#### CASES AND CARD SPECIMENS.

*Retinitis Proliferans.*—Mr. G. H. Goldsmith. The patient, an agricultural labourer, aged 18, had noticed failure of vision of his left eye ; six months ago he had been examined as a volunteer recruit and believed his sight was then normal.

The left eye had vision of less than  $\frac{6}{60}$ . The media were hazy, half a disc diameter up and out from the disc a tubular prominence could be seen projecting into the vitreous in a downward and forward direction, its extremity being most easily seen with a +7 D. Its anterior extremity was broader than its base, was fimbriated, and was movable, though only to a very slight degree. Up and out again from this projection a similar one was visible, pearly white, but lying parallel with the curve of the posterior part of the globe, and only very slightly raised above the level of the surrounding retina, and showing a vessel running across it. In the surrounding fundus several other white bands were visible, all radiating from the disc. No sign was observed of any recent hæmorrhages in either the retina or vitreous, other than the haze in the vitreous itself.

*An Ophthalmoscope for Demonstrating the Fundus Oculi.*—

Mr. W. Adams Frost. The basis of the instrument was Priestley Smith's demonstrating ophthalmoscope, the sight hole in the mirror having been greatly enlarged, but the essential modification was the presence of a central prism which divided the rays coming from the inverted image into two pencils whose direction was at right angles to the sides of the prism. The image formed by these rays, being a reflected one, is reversed, to obviate which two lateral prisms are added, which cause a second reflection and consequent re-reversal of the image. Either of the observers can quite easily indicate with a pointer any part of the fundus-image and the pointer will be clearly seen by the other observer.

*Varicose Retinal Veins with Thrombosis.*—Mr. R. W. Doyne. This patient, a man, complained of failure of vision in the right eye, the vision having become reduced to  $\frac{6}{60}$ , while in the left it was normal. An examination of the fundus showed evidence of venous thrombosis below the disc, and in several of the veins there was distinct evidence of varicosity, while in the unaffected eye there was also a tendency towards varicosity of the veins. In the right eye one vessel apparently continuous with an artery was in reality a vein, the artery could be seen lying below it and to the outer side, pulsating with a jerky pulsation peculiar to arteries; this artery was the only one which showed any signs of pulsation in the fundus.

*Retinitis Circinata.*—Mr. R. W. Doyne and Mr. S. Stephenson. The patient, a woman aged 77, had an attack of influenza four years ago. During recovery from the attack she had noticed her sight failing rather suddenly, objects appeared a long way off and very small: latterly in addition she had complained of seeing curious images before her eyes both when asleep and when awake. The right = vision fingers at 6 inches, left vision  $\frac{2}{60}$ . The central region of the right fundus was seen to be encircled by a whitish area made up of glistening white dots, mostly confluent, and lying beneath the retinal vessels. The enclosed area was of a cloudy grey colour, and contained towards its upper part a darker oval patch, perhaps representing a hæmorrhage in process of absorption. This patch could be focussed with a + 6 D. lens. No other evidences of vascular disease, or actual hæmorrhages, could be made out. The fundus of the left eye showed somewhat similar changes in the central region, but these were much less marked. There were no evidences of arterial high tension, and the urine was normal.

*Proptosis.*—Mr. W. H. Jessop. This patient, a small boy, showed extreme proptosis of the right eyeball, which was of the intermittent type, at times being much greater and at others much

less marked, but the eyeball apparently at no time occupied its normal position.

*Xerosis of the Right Cornea following Trachoma.*—Mr. S. Mayou. The patient, a man, aged 19, showed the lower half of each cornea covered by patches of xerosis, strictly limited to the cornea itself, and the edges covered with Meibomian secretion which could readily be scraped off. In the right cornea two patches had first made their appearance on either side of it, similar to those sometimes found in cases associated with night blindness. He had been under treatment for trachoma for a number of years. Both fornices were obliterated and both corneæ had been covered with pannus. Copper sulphate had been largely used, but latterly instillations of castor oil daily had been found to improve both the condition of his corneæ and conjunctivæ, and likewise his vision.

#### PAPERS.

*Tumour of the Choroid associated with Iritis.* Mr. J. H. Fisher. The patient, a woman aged 54, six years previously had had a detachment of the retina of the left eye, after which cataract formed which became complete. Later, this eye became the subject of continued inflammation and of great pain, from which the patient's general condition had suffered greatly. The eye itself showed much general injection, with discolouration of the iris and dilatations of the vessels in it; the pupil was semi-dilated and occupied by inflammatory membrane, the anterior chamber was shallow, the tension increased with the lens quite opaque and of a yellowish colour. The eye was then excised, and when hardened and cut the retina was found to be completely detached, and the sub-retinal fluid coagulated to an apple jelly-like consistency. Microscopical preparations showed the choroid near the entrance of the optic nerve to be the seat of a growth which extended into the subretinal space. The tumour, which was small, contained many vessels and some extravasations of blood among the spindle cells of which it was mainly composed; it was also pigmented, but in no part very densely so. In one part a column of cells was seen to perforate the sclerotic obliquely, a short distance from the porus opticus, apparently through one of the apertures by which one of the ciliary nerves entered the eyeball. The anterior part of the choroid was quite healthy, so that the growth was separated by a long interval from the ciliary region and iris.

No signs of any sympathetic inflammation had at any time been present in the other eye, but the case showed that a choroidal growth at least predisposes the eye in which it is contained to inflammation in its uveal tract, as also proved to be the case in the

report of a similar case read by Mr. Nettleship the same evening ; but neither case threw any light on the question as to whether such an iritis or choroiditis possessed the property of being able to reproduce itself in the fellow eye. The writer considered that a leakage of lymphatic fluid from a wounded or perforated eye—as in the present case by a growth—might not unreasonably be expected to induce considerable change in the lymphatic circulation in its fellow, the continuity of the lymph channels being established at the chiasma ; and the resulting over-activity in those parts which preside over the secretion of the nutritional fluids in order to make good the leakage in the sympathising eye, might conceivably result in inflammatory trouble, that is, in an irido-cyclitis being set up, and this is the form in which sympathetic inflammation usually manifests itself.

*An Anomalous Case of Tobacco Amblyopia.*—By Major F. O'Kinealy. The patient, a healthy Irishman, aged 42, living in India, had been in the habit of smoking only strong Burman cheroots at the rate of 300 to 500 a month (100 of which weigh about 1 lb.), and in consequence had suffered from progressive failure of vision for fourteen months. V. = R. eye,  $\frac{6}{60}$  and J. 18 ; L. eye,  $\frac{6}{60}$  and J. 16. Both discs showed greyish pallor of the temporal and lower half of each with ill-defined edges. Both fields of vision were contracted for white and for colours. In the right field a peripheral scotoma for red, and in the left field five scotomata, two peripheral ones for red, two between centre and periphery of field for green, and one central one for yellow were found. After four months' treatment with complete abstinence from tobacco and alcohol—the latter of which he had been in the habit of taking in moderate quantities—the vision became  $\frac{6}{18}$  with J. 1 in each eye. The fields, however, showed increasing contraction for white and colours ; the scotoma for red had become a complete peripheral ring scotoma, and the scotomata for yellow and green had disappeared.

Reference was also made to another case, that of a healthy Eurasian aged 38, who had lived all his life in India, who drank spirits moderately, had a past history of syphilis and smoked usually 250 Burmah cheroots together with half a pound of tobacco a month, and had done so for years. He had suffered from increasing failure of vision for some twelve months. The vision was  $\frac{6}{18}$  and J. 8 in each eye. Both fields for white, red and blue were contracted, with a typically situated paracentral scotoma in each for red and blue, also a second scotoma near the fixation point for these colours. Fields for green and yellow were absent in both eyes. After two and a half months' treatment

the vision became  $\frac{8}{10}$  and J. 1 in each eye, both fields for white and all colours began to enlarge and all the scotomata to disappear, the yellow and green fields reappearing.

*The Pathological Anatomy of the Plaques in Epithelial Xerosis.*—Mr. S. Mayou. Making reference first to the communications on the subject of epithelial xerosis of the conjunctiva described by Leber, and in particular to a paper on the subject read before this Society in 1898 by Stephenson, in which its frequency and relations to the colour fields were clearly shown, he drew attention to the discussion as to the histological changes which take place. As the result of his investigations he found that this affection occurred most usually in children who were somewhat run down in health, the plaques being always situated in the interpalpebral region and at either side of the cornea, being most marked on the temporal side, in two or three cases being only present on the temporal side. All cases were associated with night-blindness and made a good recovery. The plaques were white in colour and covered with minute bubbles of Meibomian secretion. Three reasons were given for this statement as to the secretion: (1) the appearance of the bubbles was stated to be similar in appearance to the beaten up secretion which occurs at the angles of the lids in chronic conjunctivitis; (2) if the secretion was wiped away and the lids were held apart it did not reform; (3) in one of the cases which had been of long standing the secretion had dried on the surface, and there being then no bubbles, the fatty secretion itself could be peeled off. Smear preparations and cultures made from this secretion showed the xerosis bacilli, together with other organisms. None of these organisms, however, could be found either in or between the epithelial cells, or in the deeper tissue. He pointed out that these organisms are not found in the tissue of the conjunctiva, that they are always found in the Meibomian secretion, that they behave in culture—after the initial growth on blood serum—as saphrophytes, and when inoculated into man or animals they do not reproduce the disease; for the above reasons the writer considers that they are not the cause of the plaques in question, but the changes are brought about essentially by exposure, together with perhaps a decrease in lachrymal secretion—in fact are caused by a keratinisation of the epithelium due partly to exposure and consequent drying of the epithelium, partly to the deficient lachrymal secretion occurring in children of delicate health, and as a result the Meibomian secretion with the bacilli become adherent to the plaques owing to the altered surface tension due to the keratinisation of the epithelium and the absence of mucoid change therein.

REGINALD E. BICKERTON.







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